

## The predaceous midges of the subgenus *Isohelea* of *Brachypogon* in Poland (Diptera, Ceratopogonidae)

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**Abstract.** The predaceous midges of the subgenus *Isohelea* of *Brachypogon* from Poland are described, illustrated, interpreted, and a key is provided for their recognition. The Polish fauna includes 10 species, five of which are new: *Brachypogon (Isohelea) babiogorensis*, *B. (I.) beskidicus*, *B. (I.) bialoviesicus*, *B. (I.) carpaticus*, and *(I.) zavoicus*. *Helea thienemanni* MAYER is recognized as a junior synonym of *Trishelea incompleta* KIEFFER (**NEW SYNONYMY**). *Brachypogon (Isohelea) hudjakovi* (REMM) is recorded from Central Europe. *Brachypogon (Isohelea) perpusillus* (EDWARDS), previously recorded from Poland, apparently is not a member of the fauna of that country. *Trishelea incompleta* KIEFFER is resurrected from synonymy with *Psilohelea perpusilla* EDWARDS, and a neotype is designated for it.

**Key words:** *Diptera*, *Ceratopogonidae*, *Brachypogon*, *Isohelea*, new species, new synonymy.

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*Brachypogon* is a moderately large genus of small predaceous midges of nearly worldwide distribution containing almost 100 extant species. Females prey on *Chironomidae* (EDWARDS 1923; DOWNES 1978), but in Europe, only *B. (I.) nitidulus* (EDWARDS) has been recorded feeding on *Orthocladus ribicundus* (MEIGEN) (EDWARDS 1923). EDWARDS (1926) observed that *B.(I.) nitidulus* and *B.(I.) sociabilis* (GOETGHEBUER) fly in swarms in hot sun, and SZADZIEWSKI & KRZYWIŃSKI (1988) found adults of both sexes to be common on umbelliferous flowers. Larvae of *B. (Isohelea)* live in small pools at the margins of lakes and rivers or in waters associated with peat bogs and are good swimmers (MAYER 1940; GLUCHOVA 1979). Pupae are barely able to cling to the surface tension of the water and can survive under water for long periods of time (GLUCHOVA 1979).

GROGAN (1982) and WIRTH & GROGAN (1988) considered *Isohelea* as a subgenus of *Brachypogon*. More recently, DEBENHAM (1991) proposed a new subgenus *Sarissohelea*, for Australasian species which have only the first radial cell, a costal ratio of 0.62-0.65, and the radius meeting the costa at an oblique angle. *Isohelea* is separated from *Brachypogon* (B.) by wing which usually has both radial cells, vein M2 and macrotrichia on the wing margin, 4th palpal segment with 1-4 long setae and females usually with two spermathecae (WIRTH & GROGAN 1988).

BORKENT (1992) demonstrated that katapisternal and anepisternal setae are useful as diagnostic characters for the identification of certain Holarctic genera of the tribe *Ceratopogonini*. In his key, he indicated that species of *Brachypogon* totally lack anepisternal setae (couplet 4). We discovered that one of the new species described herein (*B. zavoicus*) has 1 anepisternal seta on the median anepisternal plate (Fig. 19B). Therefore, the key proposed by BORKENT (1992) should be modified as follows:

4. Anterior sclerite of anepisternum with 2-3 setae on posterior margin; male antenna with flagellomeres 2-5 articulated, not fused . . . . . *Ceratoculicoides* WIRTH & RATANAWORABHAN  
 - Anterior sclerite of anepisternum lacking setae; male antenna with flagellomeres 2-6 fused . . . . . *Brachypogon* KIEFFER

Two subgenera, *Brachypogon* (B.) and *Isohelea* are known to occur in Poland, including *B. vitiosus* (WINNERTZ) (SZADZIEWSKI & HAVELKA 1984) and *B. nieves* (HAVELKA) (SZADZIEWSKI 1991) in *Brachypogon* (B.). In the subgenus *Isohelea*, four species have been recorded: *B. silecis* SZADZIEWSKI (1990), *B. nitidulus*, *B. perpusillus*, and *B. sociabilis* (SZADZIEWSKI 1991).

The present study is based mainly on the material from our collections. Specimens collected by employees of the Institute of Zoology, Polish Acad. Sci., Warsaw, are labelled IZPAN. Most of the specimens have been collected with an entomological net from umbelliferous flowers and bushes, some at light traps, in yellow pan-traps, and a few reared from mud. All specimens are mounted on slides in Canada balsam and phenol as described by WIRTH & MARSTON (1968).

The following special terms are used in the descriptions:

Female antennal ratio (AR) is the combined length of the distal five flagellomeres divided by the combined length of the remaining eight proximal flagellomeres. Wing length is measured from the basal arculus to the wing tip; the costal ratio (CR) is the length of costa divided by the wing length. Tarsal ratio (TR) is the length of first tarsomere divided by the length of the second tarsomere, of fore leg – TR(I), of middle leg – TR(II), of hind leg – TR(III). The length of seminal capsule includes the neck.

Types of the new species, and the neotype of *Trishelea incompleta*, are deposited in the Department of Invertebrate Zoology, University of Gdańsk [UG]. Paratypes of *Brachypogon bialoviesicus* are deposited in Institute of Zoology, Pol. Acad. Sci., Warsaw

[IZPAN]; Institute of Systematics and Evolution of Animals, Pol. Acad. Sci., Cracow [ISEA]; Natural History Museum (British Museum), London [BMNH].

We express our thanks to Dr Waldemar MIKOŁAJCZYK, for the materials collected by the staff of Institute of Zoology, Polish Acad. Sci., Warsaw; to Dr Peter HAVELKA of Karlsruhe (Germany) for sending us syntypes of *Ceratopogon thienemanni*; and to Dr Brian R. PITKIN, of the Natural History Museum, London, for the loan of the holotype of *Psilohelea perpusilla*.

We are much indebted to Dr Peter HAVELKA of Karlsruhe and Dr Jean CLASTRIER of Muséum National d'Histoire Naturelle, Paris, who reviewed the manuscript, and to Dr William L. GROGAN Jr. of Salisbury State University who reviewed and carefully corrected our English.

### **Genus *Brachypogon* KIEFFER, 1899**

#### Subgenus *Isohelea* KIEFFER, 1917

**Diagnosis** (limited to the Polish fauna). Small predaceous midges of the tribe Ceratopogonini differing from all other ceratopogonid genera by the following combination of characters: katepisternum with one or more large setae; male antenna with flagellomeres II-XI fused; wing with two radial cells and macrotrichia usually present on wing margin, membrane lacking microtrichia.

**Description.** Small midges with wing length 0.9-1.3 mm (Fig. 1). Body dark brown or brown with more or less pale tarsi and halteres. Eyes pubescent, contiguous in female, separate in male. Flagellum composed of 13 flagellomeres. Male flagellomeres II-XI fused, plume well developed. First flagellomere with 2-3 sensilla coeloconica. Female proximal flagellomeres short, ovoid; distal five flagellomeres elongate, cylindrical (Fig. 10 A). Palpus 5-segmented. Third palpal segment with well defined sensory pit (Fig. 10 B). Fourth palpal segment usually with 1-3 setae, or rarely left or right one lacking or bearing 4 long setae. Female mandible with 10-13 coarse teeth (Figs 5 B, 10 C, 14 C, 19 A).

Female claws moderately long, slightly unequal, each with basal inner tooth (Fig. 17 A). Male claws equal, tips bifid, each with long curved seta at base (Fig. 15 A, B). Fourth tarsomeres subcylindrical, shorter in female, with 2 apical sinuous capitate sensilla (Figs 15 A, 17 A). First tarsomere of hind leg somewhat enlarged with a single row of dense, straight palisade setae; no subbasal or apical spines. Tibial spur of fore leg long; of hind leg short, bifid or trifid. Tarsal ratios similar in all species and are of no diagnostic value; tarsal ratio of hind and fore legs usually distinctly lower than that of middle leg. Scutellum with 2 lateral and 2 submedian setae. Anepisternum bare, or with 1 long seta on median anepisternum; katepisternum with 1-4 setae (Fig. 19 B). Wing almost transparent. Wing membrane without microtrichia, and with a few macrotrichia at wing tip in cell r4+5 and along caudal margin. Veins usually barely visible in mounted specimens. First

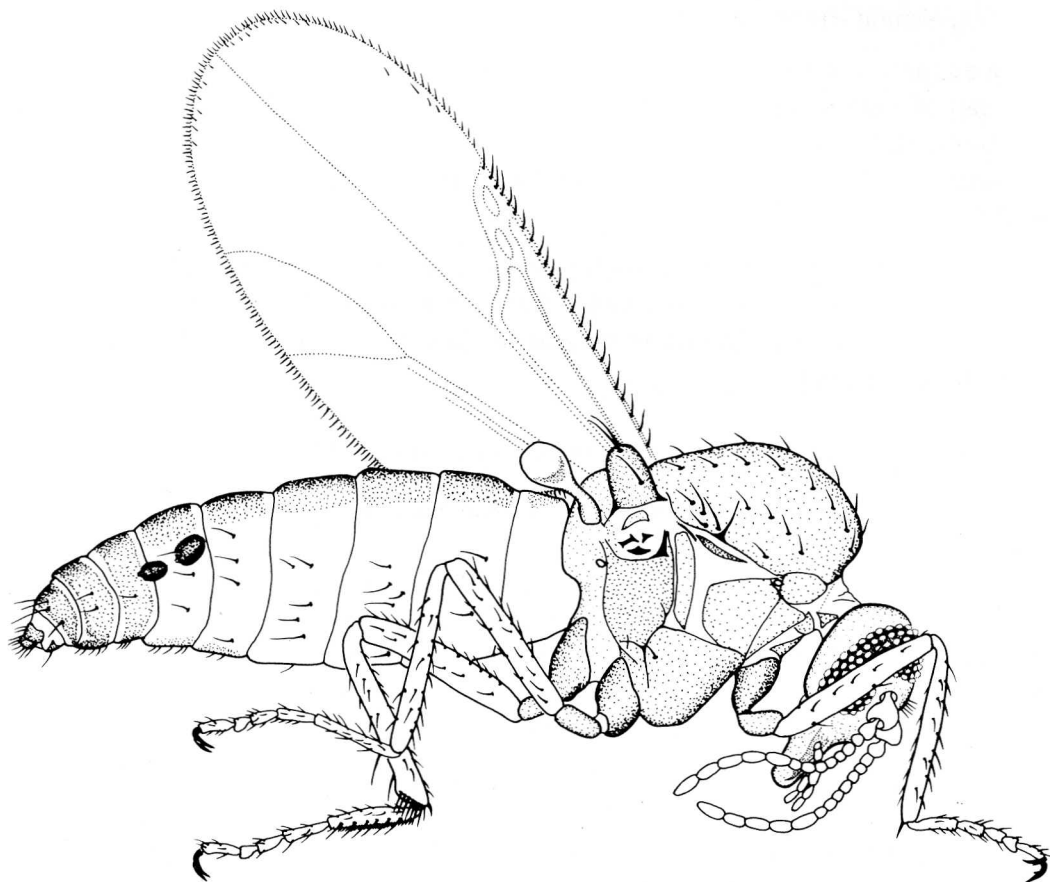


Fig. 1. *Brachypogon (Isohelea) bialoviesicus* sp. n., total view of female.

and second radial cells small, first sometimes almost linear. Costal ratio in male 0.50-0.54; in female 0.58-0.63.

Male genitalia large. Tergite IX usually with short apicolateral processes. Aedeagus usually triangular. Parameres usually stout, fused or separated. Proctiger usually heavily sclerotized and often forms distinct plate (hypoproct) situated between the aedeagus and tergite IX. Sternite VIII of female usually separated from tergite by pleurae, sometimes the sternite and tergite are fused and form a complete ring (undetermined specimens). Sternite IX divided into 2 lateral halves fused with tergite IX; submedian projections simple or bicorned (undetermined specimens). Sternite X with 2 large setae. Female with 1-2 functional seminal capsules.

Key to Polish species of *Brachypogon* (*Isohelea*)

## Males

1. Anepisternum with 1 seta (Fig. 19 B). Tip of gonostylus bilobed . . . . . *B. (I.) zavoicus* sp. n.
- Anepisternum without setae. Tip of gonostylus simple . . . . . 2
2. Katepisternum with 1 seta . . . . . 3
- Katepisternum with 2-4 setae (Fig. 19 B) . . . . . 8
3. Parameres separate. Cerci large (Fig. 13 A) . . . . . *B. (I.) nitidulus* (EDWARDS)
- Parameres fused medially. Cerci small (Fig. 2) . . . . . 4
4. Distal portion of parameres slender (Fig. 4 A, D) . . . . . *B. (I.) bialoviesicus* sp. n.
- Distal portion of parameres broad (Fig. 2 D) . . . . . 5
5. Distal portion of gonostylus stout and flattened (Fig. 3 B) . . . . . *B. (I.) beskidicus* sp. n.
- Distal portion of gonostylus slender and cylindrical (Figs 2 B, 7 B) . . . . . 6
6. Parameres greatly diverging (Fig. 7 D) . . . . . *B. (I.) hudjakovi* (REMM)
- Parameres parallel or weakly diverging (Figs 2, 6) . . . . . 7
7. Apices of parameres evenly pointed. Distal portion of proctiger heavily sclerotized (Fig. 2 E) . . . . . *B. (I.) babiogorensis* sp. n.
- Apices of parameres broad, shortly acute. Distal portion of proctiger weakly sclerotized (Fig. 6 E) . . . . . *B. (I.) carpaticus* sp. n.
8. Distal portion of parameres absent. Aedeagus short (Fig. 15 E) . . . . . *B. (I.) silecis* SZADZIEWSKI
- Distal portion of parameres present. Aedeagus long (Fig. 16 C) . . . . . 9
9. Aedeagus slender with simple blunt apex. Parameres long, with slender pointed apices (Fig. 16 A-C) . . . . . *B. (I.) sociabilis* (GOETGHEBUER)
- Aedeagus broad with forked apex. Parameres short, with broad blunt apices (Fig. 9 D) . . . . . *B. (I.) incompletus* (KIEFFER)

## Females

1. One seminal capsules . . . . . *B. (I.) nitidulus* (EDWARDS)
- Two seminal capsules . . . . . 2
2. Median sclerite of anepisternum with one seta . . . . . *B. (I.) zavoicus* sp. n.
- Anepisternum lacking setae . . . . . 3
3. Seminal capsules with long neck . . . . . *B. (I.) sociabilis* (GOETGHEBUER)
- Seminal capsules with short neck . . . . . 4
4. Seminal capsules asymmetrical . . . . . *B. (I.) bialoviesicus* sp. n.
- Seminal capsules symmetrical . . . . . 5
5. Katepisternum with 2-3 setae . . . . . *B. (I.) incompletus* (KIEFFER)
- Katepisternum with 1 seta . . . . . *B. (I.) hudjakovi* (REMM)

***Brachypogon (Isohelea) babiogorensis* SZADZIEWSKI, sp. n.**

Fig. 2

**D i a g n o s i s .** Male with 1 katepisternal seta and bare anepisternum; long and stout gonostyli, with sharply pointed and curved tip; well developed broad, fused parameres; aedeagus with two short apical appendices; and heavily sclerotized proctiger. Female unknown.

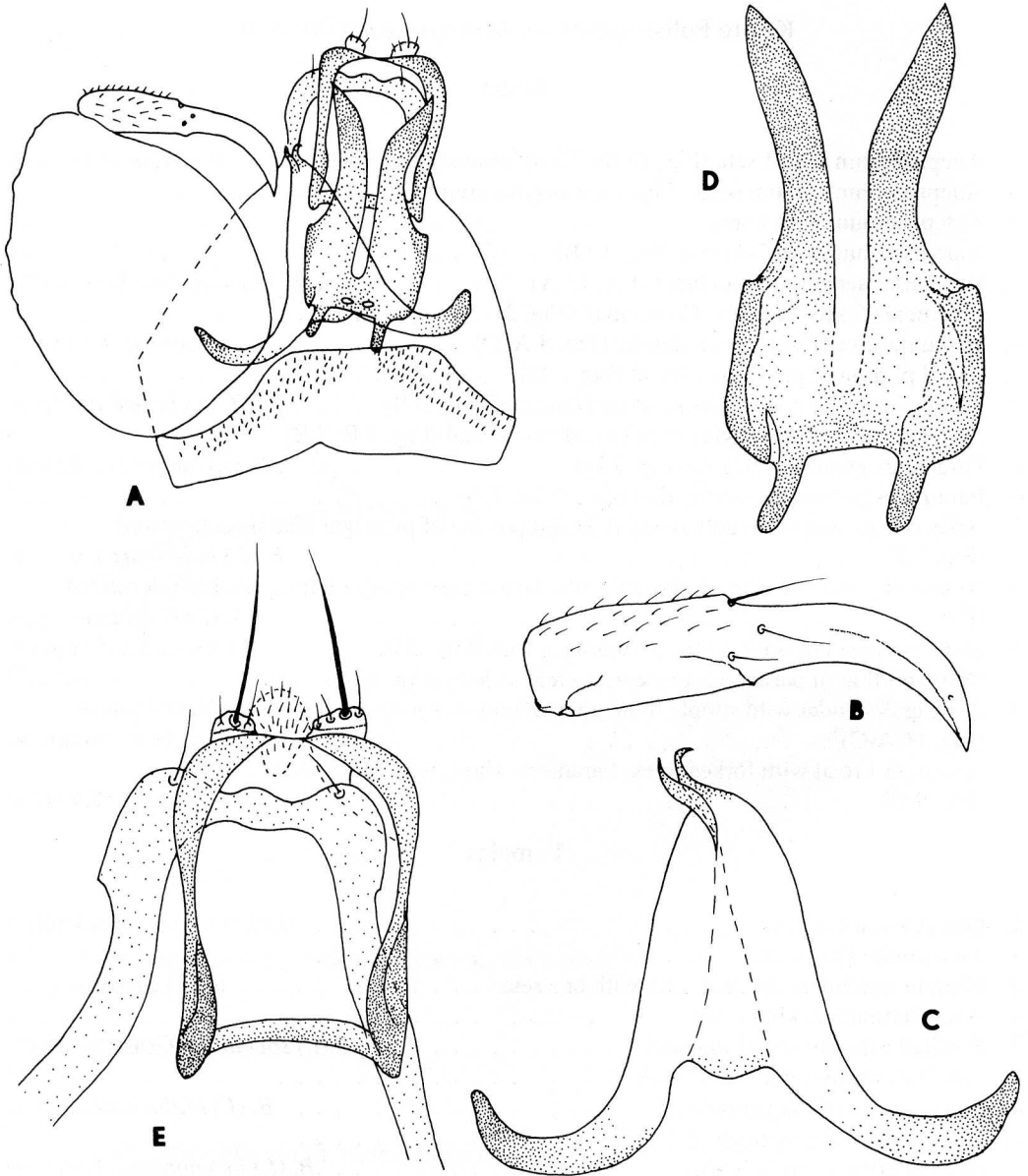


Fig. 2. *Brachypogon (Isohelea) babiogorensis* sp. n., male: A – ventral aspect of genitalia; B – gonostylus; C – aedeagus; D – parameres; E – proctiger and tip of tergite IX.

**Description.** ♂. Total length of flagellum 535  $\mu$ m. First flagellomere with 2 sensilla coeloconica. Third palpal segment with distinct sensory pit, length 46  $\mu$ m; 4th segment bears 1 long seta.

Katepisternum with 1 lateral seta; anepisternum bare. Tibial comb composed of 7 spines. Hind basitarsus somewhat swollen, with a single row of palisade setae. Fourth tarsomeres subcylindrical. Tarsal ratio of fore leg 1.5, of middle leg 2.1, of hind leg 1.5.

Wing transparent, length 1.08 mm, CR 0.53. Radial veins barely visible, both radial cells small. Vein M2 obsolete. Wing membrane without microtrichia and with a few macrotrichia along the wing margin in cell r4+5. Halter not visible.

Genitalia (Fig. 2). Sternite IX short and broad, caudal margin almost straight. Distal portion of tergite IX slender and weakly enlarged at apex; apicolateral processes small, poorly developed, each with a single apical seta; lateral and apical margins broadly sclerotized. Hypoproct heavily sclerotized, with apicolateral portions evenly rounded in ventral view (Fig. 2 E). Cerci short, each with 1 long and 2-3 shorter setae. Gonostylus relatively long and slender, with abruptly pointed and curved tip, basal half with sparse short setae on lateral and dorsal surfaces, at midlength with longer setae (Fig. 2 B). Aedeagus Y-shaped, as long as broad; aedeagal main body long and slender, with two pointed and curved apical projections; basal arms very long, recurved; basal arch low (Fig. 2 C). Parameres stout, heavily sclerotized, fused at bases; basal projections relatively long; distal portion of each paramere stout, blade-shaped, with evenly pointed apex (Fig. 2 D).

♀. Unknown.

Material examined. Holotype ♂, Carpathians, Babia Góra Mt., Zawoja-Barańcowa, 700 m, 27 vi 1989, on umbelliferous flowers (*Apiaceae*), R. SZADZIEWSKI [UG].

Etymology. This species is named for the type-locality (Babia Góra Mt.).

### ***Brachypogon (Isohelea) beskidicus* KRZYWIŃSKI, sp. n.**

Fig. 3

Diagnosis. Male with 1 katepisternal seta; long, stout, fused parameres; and gonostyli with broad, flattened apical portion.

Description. ♂ (Intersex). Antennae of female type, incomplete. Proboscis of male type. Third palpal segment with deep sensory pit, length 43 µm; 4th segment with 1 long seta. Anepisternum bare, katepisternum with 1 lateral seta. Tibial comb composed of 6 spines. Fore tibial spur long and simple; hind tibial spur short, forked. Fourth tarsomeres with 2 sinuate sensory setae. TR(I) 1.4, TR(II) 1.8, TR(III) 1.9. Wing nearly transparent, length 0.93 mm, CR 0.52; both radial cells small. Wing membrane without discernable microtrichia and with a few macrotrichia in cell r4+5 along wing margin. Halter stem dark, knob slightly brownish.

Genitalia (Fig. 3 A-E). Sternite IX broad. Tergite IX long, gradually tapering to somewhat enlarged and bilobed apex; each apicolateral lobe with distinct apical seta. Gonocoxite stout; gonostylus nearly straight, with apex flattened, somewhat bilobed and pointed; 5 long setae at mid portion and short setae on basal half (Fig. 3 B). Aedeagus broadly triangular; apex barely visible, simple; basal arch low; basal arms moderately long, recurved. Parameres broadly fused at bases; distal portion stout, slightly tapering to blunt tip (Fig. 3 D).

♀. Unknown.

**Material examined.** Holotype ♂ (Intersex), Carpathians, Beskidy Mts., Przyborów near Żywiec, about 500 m, sweeping along Koszarowa river, 19 vii 1992, J. KRZYWIŃSKI [UG].

**Note.** The species name refers to the Beskidy Mts where it was collected. The holotype is an intersex with a female-like antenna. We decided to name it because it has normal genitalia.

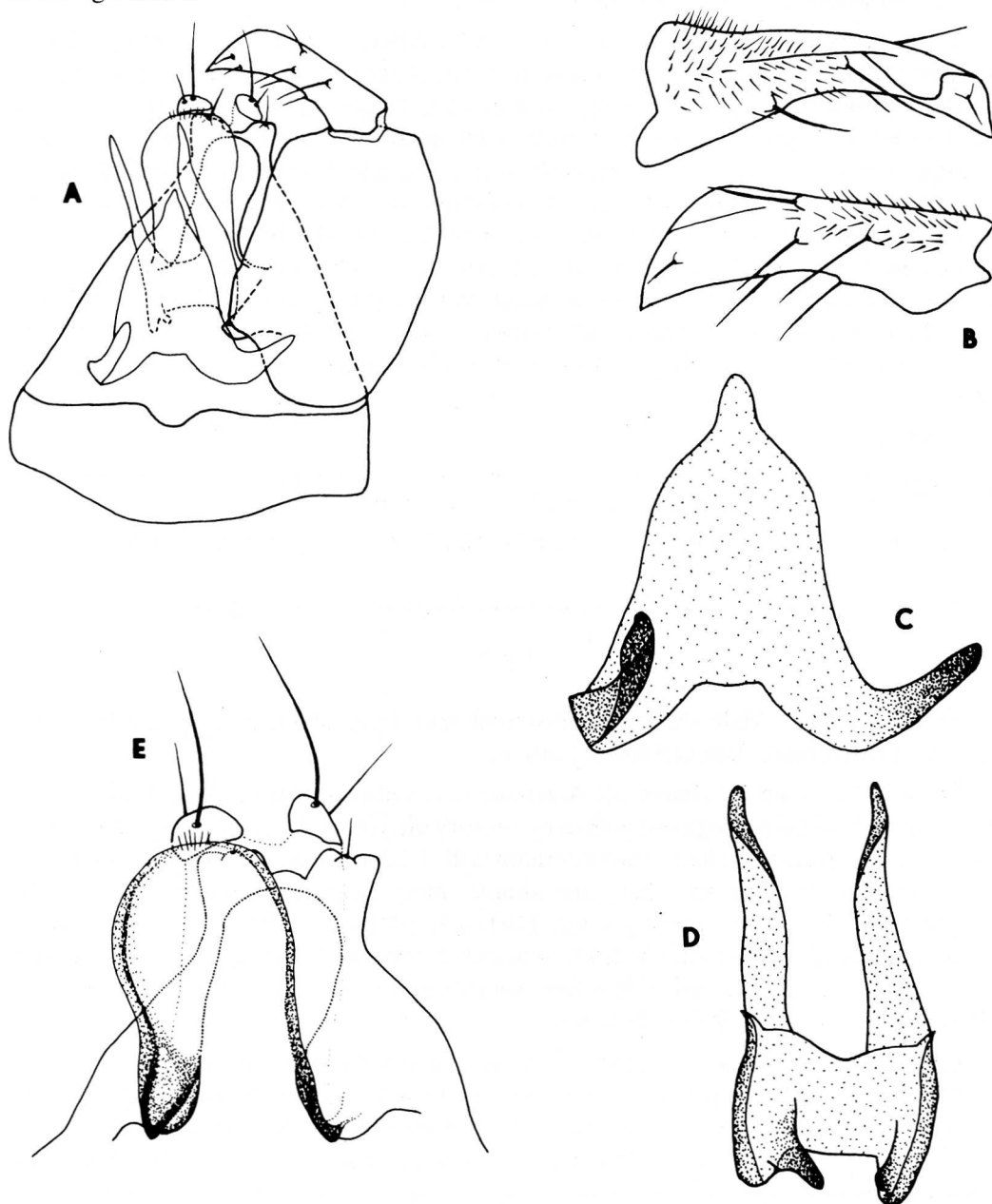


Fig. 3. *Brachypogon (Isohelea) beskidicus* sp. n., male: A – ventral aspect of genitalia; B – gonostyli; C – aedeagus; D – parameres; E – proctiger and tip of tergite IX.



***Brachypogon (Isohelea) bialoviesicus* KRZYWIŃSKI, sp.n.**

Figs 1, 4-5

**D i a g n o s i s .** Distinguished by having 1 katepisternal seta. Male with short gonostyli which taper gradually from midportion to a curved tip; distal portions of parameres long and slender; and aedeagus slender with 2 pointed apical projections. Female with 2 unequal, asymmetrical seminal capsules.

**D e s c r i p t i o n .** ♂. Flagellum 629-674  $\mu\text{m}$ ; first flagellomere with 2 sensilla coeloconica. Third palpal segment moderately swollen, with distinct sensory pit, length 49-57  $\mu\text{m}$ ; 4th segment with 1-2 long setae.

Katepisternum with 1 seta, anepisternum bare. Tibial comb composed of 8 spines. TR(I) – 1.3-1.7, TR(II) – 1.7-2.2, TR(III) – 1.5-1.8. Wing transparent, length 1.06-1.22 mm, CR – 0.50-0.53. Radial veins and membrane pale; radial cells well developed. Wing membrane without microtrichia, macrotrichia present along wing margin. Halter pale.

Genitalia (Fig. 4). Sternite IX short with shallow caudomedian excavation. Tergite IX long, with distinct subapical constriction; apicolateral lobes evenly rounded, each bearing a single long apical seta. Cerci short, bearing one long and some shorter setae (Fig. 4 E). Proctiger moderately sclerotized. Gonostylus relatively short, tapering gradually from midportion to slightly curved tip. Aedeagus triangular, slender, with strongly sclerotized lateral portions ending as free pointed appendices (Fig. 4 C). Parameres long, connected by a narrow bridge at base (Figs 4 B, D); basal arms long; distal portions long, slender, almost parallel, apices pointed.

♀. Flagellum length 417-486  $\mu\text{m}$ ; AR 1.06-1.48; first flagellomere with 3 sensilla coeloconica (Fig. 5 A). Third palpal segment 40-54  $\mu\text{m}$  long; 4th segment with 1-3 long setae (in some specimens left or right segment without setae). Mandible with 10-11 medial teeth. Katepisternum with one seta; anepisternum bare. TR(I) 1.6-1.9, TR(II) 2.0-2.4, TR(III) 1.9-2.1. Wing length 1.00-1.22  $\mu\text{m}$ , CR 0.58-0.62. Two unequal, asymmetrical seminal capsules with distinct necks (Fig. 5 D), 74-80 and 56-66  $\mu\text{m}$  long. Sternite VIII rather uniformly sclerotized and separated from tergite VIII (Fig. 5 E). Sternite IX with submedian halves slender, with slender recurved apices (Fig. 5 F).

**M a t e r i a l e x a m i n e d .** **H o l o t y p e**, ♂ – northeastern Poland, Puszcza Białowieska, forest section 538 Bc, 3 vi 1987, yellow pan traps in pine forest, IZPAN [UG]. **P a r a t y p e s**: Puszcza Białowieska: same data as the holotype, 2 ♂♂ [UG]; forest section 538 Bf, 3 vi 1987, in pine forest, 3 ♂♂ [UG]; forest section 538 Ba, 3 vi 1987, in pine forest, 1 ♂ [BMNH]; forest section 538 Ba, 22 v 1987, in pine forest, 1 ♂ [IZPAN]; forest section 637 Ef, 22 v 1987, in pine forest, 3 ♂♂ [UG]; forest section 668 Cc, 4 vi 1987, in pine forest, 3 ♂♂ [UG]; forest section 668 Ad2, 4 vi 1987, in pine forest, 2 ♂♂ [ISEA]; forest section 315 D, 6 vi 1991, in ash forest, 1 ♂ [BMNH]; Młochów near Warsaw, 13 v - 10 vi 1991, 2 ♂♂ [IZPAN].

Specimens not included into the type series:

Podlasie: Puszcza Białowieska: 22 v, 4 vi 1987, forest section 668 Cc, 8 ♀♀; 4 vi 1987, pine forest, forest section 668 Ad2, 6 ♀♀; 3 vi 1987, forest section 538 Ba, 1 ♀; 3 vi 1987, forest section 538 Bf, 1 ♀; 4-5 vi 1987, forest section 668 Af1, 4 ♀♀; 17 vi 1987, forest section 634 Ef, 1 ♀; all in pine forest.

Central Polish Lowlands: Puszcza Biała, 20 v 1986, pine forest, section 62g, yellow pan-traps, 2 ♀♀; Kampinoski National Park, 30 v to 4 vi 1979, ash-oak forest, yellow pan-traps, 2 ♀♀; Młochów nr. Warsaw, 13 v to 10 vi 1991, yellow pan-traps, 3 ♀♀.

Outer West Carpathians: Czarne nr. Wisła at Biała Wiselka river, 16 vii 1992, netting, 1 ♀, J. KRZYWIŃSKI.

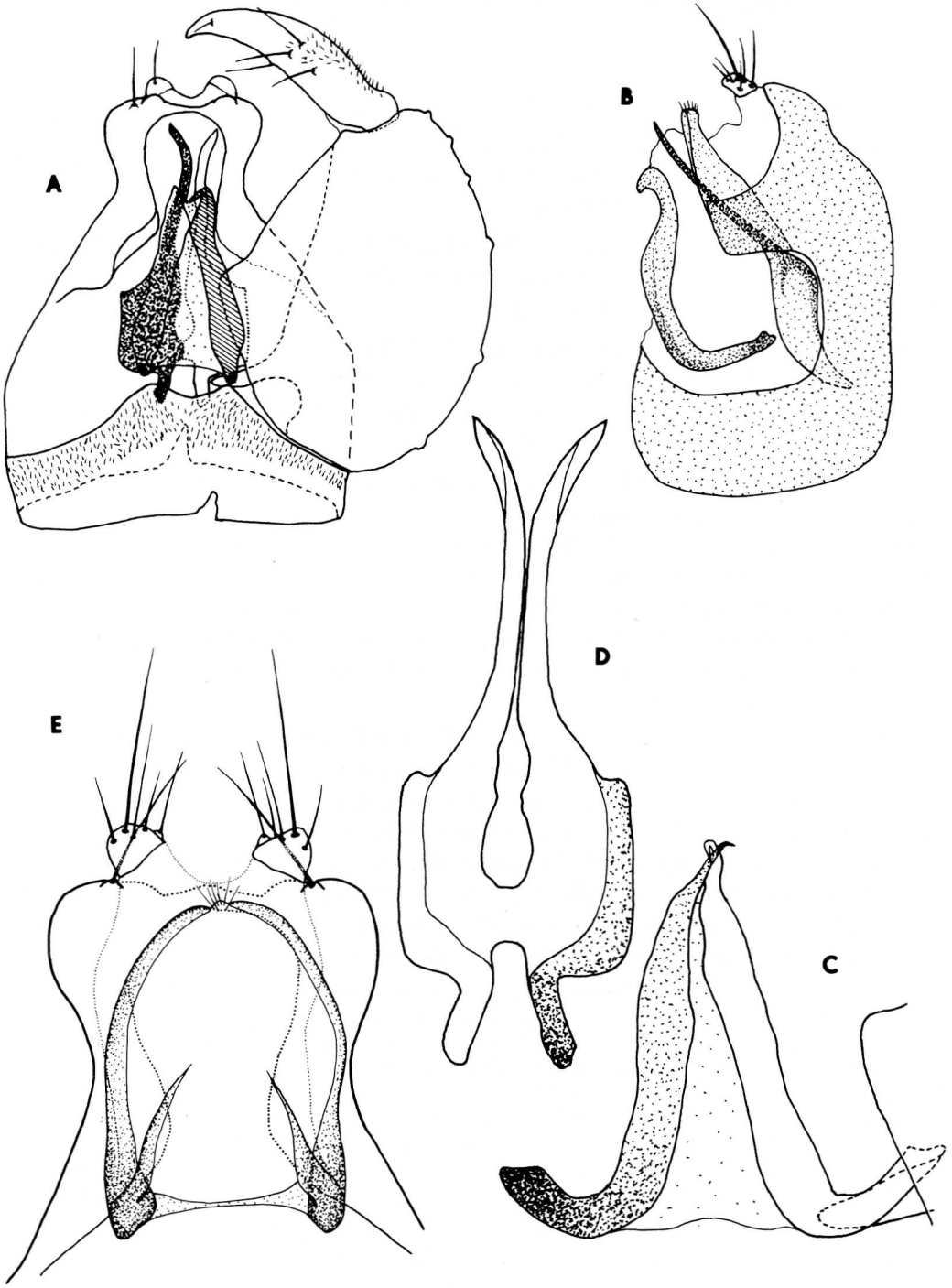


Fig. 4. *Brachypogon (Isohelea) bialoviesicus* sp. n., male: A – ventral aspect of genitalia; B – lateral aspect of genitalia; C – aedeagus; D – parameres; E – proctiger and tip of tergite IX.

All specimens, if not otherwise indicated, were collected with yellow pan traps by the employees of the Institute of Zoology, IZPAN.

**Note.** The specific epithet is a reference to the Puszcza Białowieska primaeval forest, where most of the type series was collected. The male genitalia of this species are similar to those of *B. perpusillus* from Scotland (Fig. 12). However, in the latter species, the parameres are much stouter with short and broad distal portions.

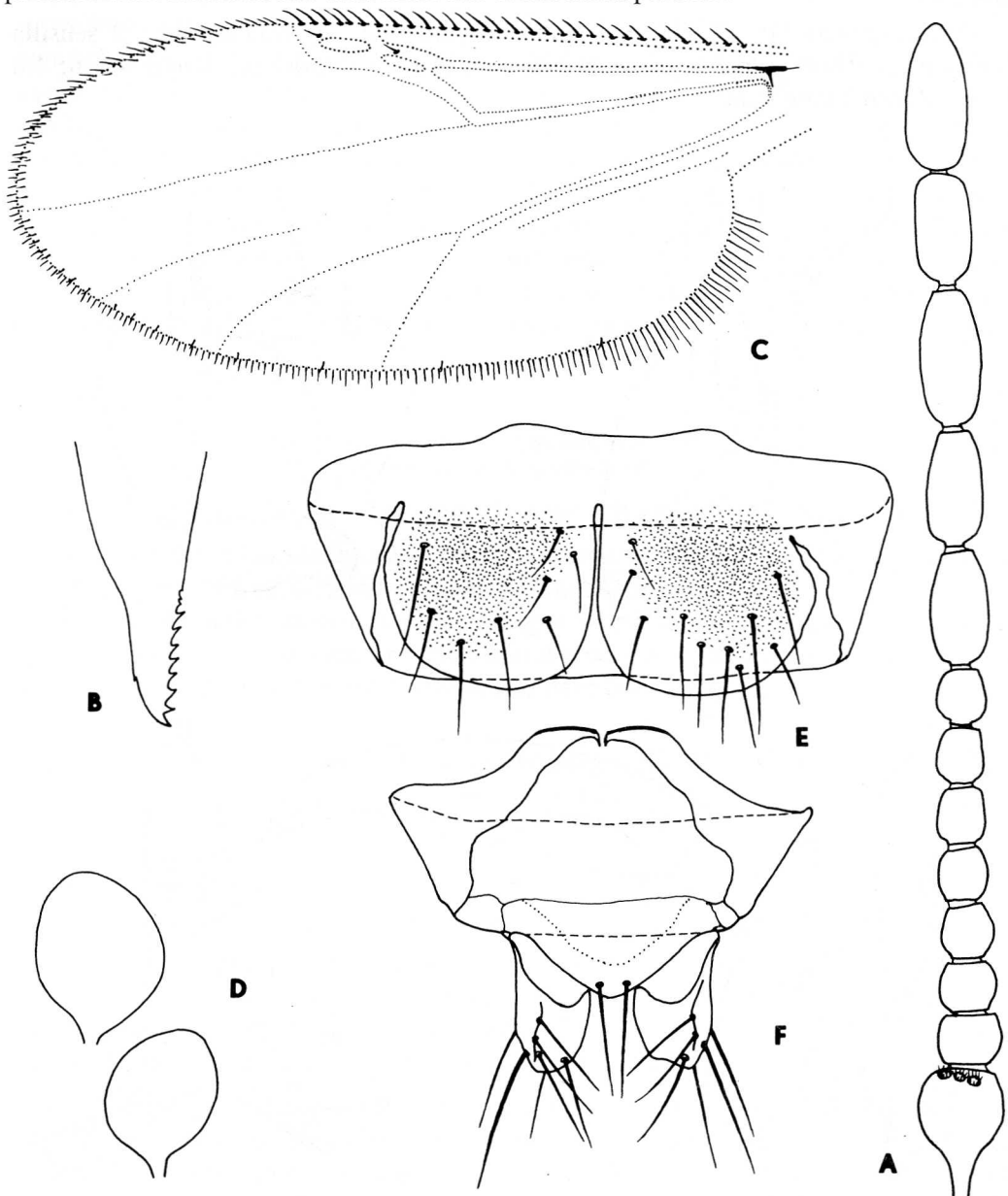


Fig. 5. *Brachypogon (Isohelea) bialoviesicus* sp. n., female: A – flagellum; B – mandible; C – wing; D – seminal capsules; E – sternite VIII; F – sternite IX, X and cerci.

***Brachypogon (Isohelea) carpaticus* SZADZIEWSKI, sp. n.**

Fig. 6

**Diagnosis.** Male with 1 katepisternal seta; gonostylus moderately long, with simple pointed tip; aedeagus slender with forked apex; and parameres broad, heavily sclerotized, nearly U-shaped, with broad lateral arms bearing spinules at apex. Female unknown.

**Description.** ♂. Flagellum length 556  $\mu\text{m}$ ; first flagellomere with 2 sensilla coeloconica. Third palpal segment broad, with distinct sensory pit, length 41  $\mu\text{m}$ ; 4th segment with 2 long setae.

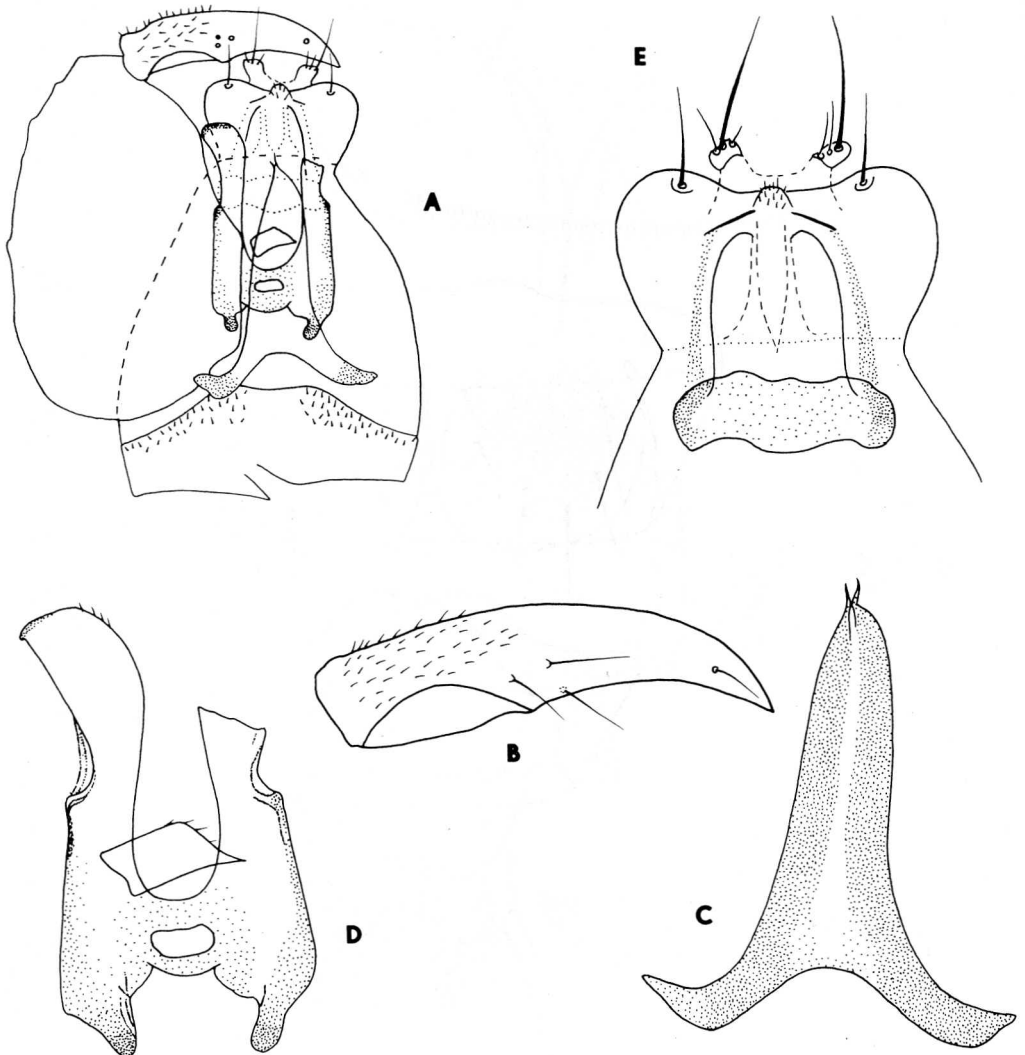


Fig. 6. *Brachypogon (Isohelea) carpaticus* sp. n., male: A – ventral aspect of genitalia; B – gonostylus; C – aedeagus; D – parameres; E – proctiger and apex of tergite IX.

Katepisternum with 1 seta; anepisternum bare. Tibial comb composed of 7 spines of the same length. Hind tibial spur short, probably forked. Hind basitarsus swollen, with single row of palisade setae. Fourth tarsomeres subcylindrical. Tarsal ratio of fore leg 1.7, of middle leg 2.1, of hind leg 1.7. Halter knob brownish. Wing transparent, length 1.10 mm, CR 0.52. Radial veins pale, radial cells small, well developed. Vein M2 obsolete. Wing membrane with few macrotrichia along wing margin in cell r4+5, lacking microtrichia.

Genitalia (Fig. 6). Sternite IX short and broad, with very shallow caudomedial excavation. Tergite IX tapering to subapical constriction, then forming broad evenly rounded ear-shaped structure; apicolateral process with long apical seta. Hypoproct weakly sclerotized except for broad basal transverse bridge (Fig. 6 E). Gonocoxite stout and long; gonostylus moderately long and slender, with evenly pointed and slightly curved simple tip. Aedeagus long and slender, poorly sclerotized along midline, basal arms long, recurved, basal arch very low; tip tapered, with two slender appendices. Parameres well developed and heavily sclerotized; narrowly fused at bases into H-shaped structure, the bridge with unsclerotized window; proximal portion of each paramere with slender rounded and short apodeme; distal portion of paramere broad, with excavation at level of base of hypoproct, apex evenly rounded or pointed; inner margin before apex with 4 short spinules.

♀. Unknown.

Material examined. **H o l o t y p e** ♂, Carpathians, Babia Góra Mt., Zawoja-Barańcowa, 700 m, 27 vi 1989, on umbelliferous flowers (*Apiaceae*), R. SZADZIEWSKI [UG].

**D i s c u s s i o n**. This species is named for the collection site in the Carpathian Mts.

The new species has male genitalia which superficially are somewhat similar to those of *B. aquilonalis* (CLASTRIER) from Finland (CLASTRIER 1961). According to the original description, the latter species has an aedeagus which in ventral view resembles the parameres of this new species. The apicolateral processes of tergite IX in *B. aquilonalis* bear several setae while those of *B. carpaticus* have only a single seta.

### ***Brachypogon (Isohelea) hudjakovi* (REMM, 1974)**

Figs 7-8

*Ceratopogon (Isohelea) hudjakovi* REMM, 1974: 53 (♂, Russia, Marijskaja ASSR).

*Brachypogon (Isohelea) hudjakovi*: WIRTH & GROGAN 1988: 31 (combination).

**D e s c r i p t i o n**. ♂. Flagellum length 503-549 µm; first flagellomere with 2-3 sensilla coeloconica. Fourth palpal segment with 1-2 setae. Katepisternum with 1 seta; anepisternum bare. Tibial comb composed of 7 spines. TR(I) 1.5-1.6, TR(II) 1.8-2.2, TR(III) 1.6-1.8. Wing pale, length 0.93-0.98 mm, CR 0.50-0.52.

Genitalia (Fig. 7). Sternite IX short with shallow indistinct caudomedian excavation (Fig. 7 A). Tergite IX long; apicolateral process with single apical seta; cerci short. Gonostylus simple, stout, with evenly pointed tip (Fig. 7 B). Aedeagus triangular, with heavily sclerotized lateral portions, apex slightly concave (Fig. 7 C). Parameres fused at base, distal portions long, blade-shaped, greatly diverging (Fig. 7 D).

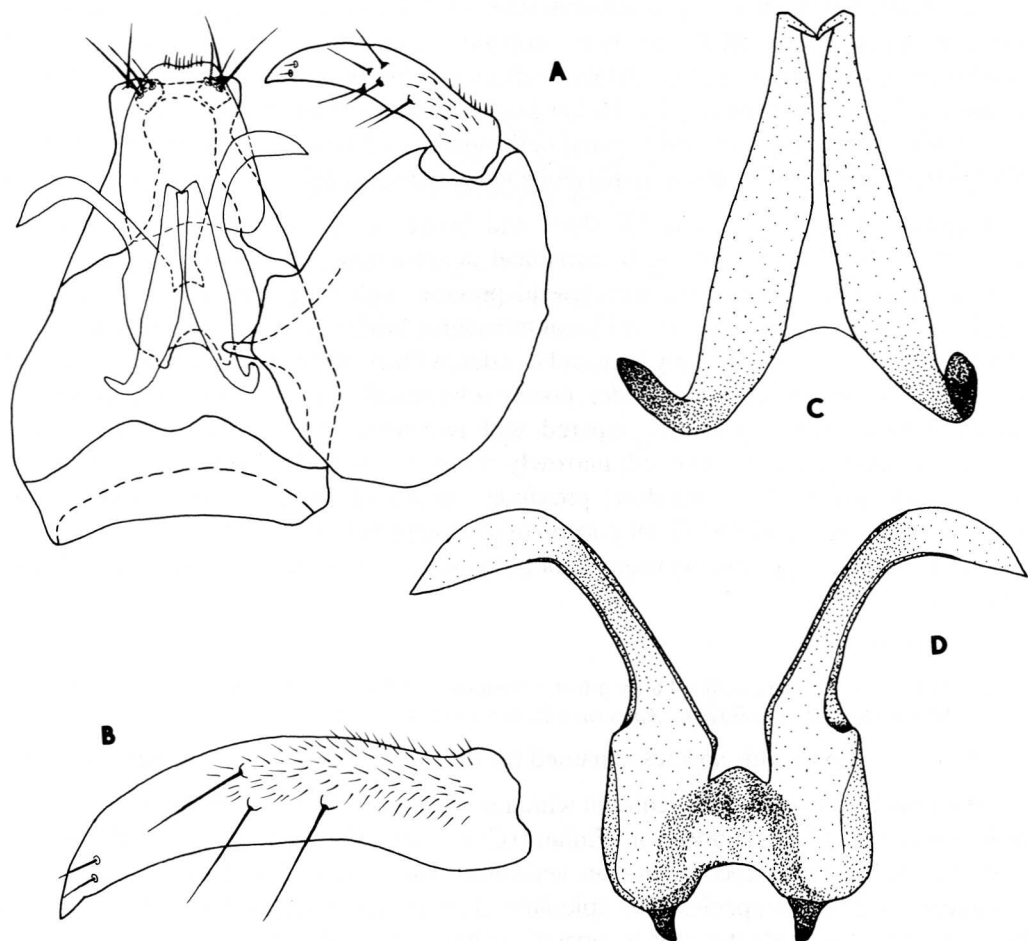


Fig. 7. *Brachypogon (Isohelea) hudjakovi* REMM, male: A – ventral aspect of genitalia; B – gonostylus; C – aedeagus; D – parameres.

♀. Flagellum length 377-389  $\mu\text{m}$ ; AR 1.20-1.27; first flagellomere with 3 sensilla coeloconica. Third palpal segment 39  $\mu\text{m}$  long; 4th segment with 2-3 setae. Mandible with 13 coarse medial teeth. Hind tibial comb composed of 8 spines. TR(I) 1.6, TR(II) 1.7-1.9, TR(III) 1.9-2.0. Wing pale, length 1.00-1.02 mm, CR 0.56-0.58. Sternite VIII with well sclerotized slightly concave proximal margin (Fig. 8 B). Sternite IX with long, simple, slender recurved submedian apices (Fig. 8 C). Sternite X with 2 long setae. Two unequal, symmetrical seminal capsules (Fig. 8 A); larger 71.5  $\mu\text{m}$ , smaller 68.6  $\mu\text{m}$  long.

Material examined. Carpathians, Tatra Mts.: Miętusi Potok nr. Krowi Żleb, Miętusi Przysłop, Polana Strążyska, 1040-1100 m, 19-21 vii 1993, on umbelliferous flowers, 5 ♂, 3 ♀, J. KRZYWIŃSKI.

**D i s c u s s i o n .** This species was described from a single male collected at light in northeastern part of the European region of Russia. This is the first record of the species in Poland and Central Europe, and the hitherto unknown female is described for the first time also. It appears that *B. hudjakovi* is a boreal faunal element in Poland as the holotype was taken far north of the Carpathian mountains where it was collected over 1000 m above sea level.

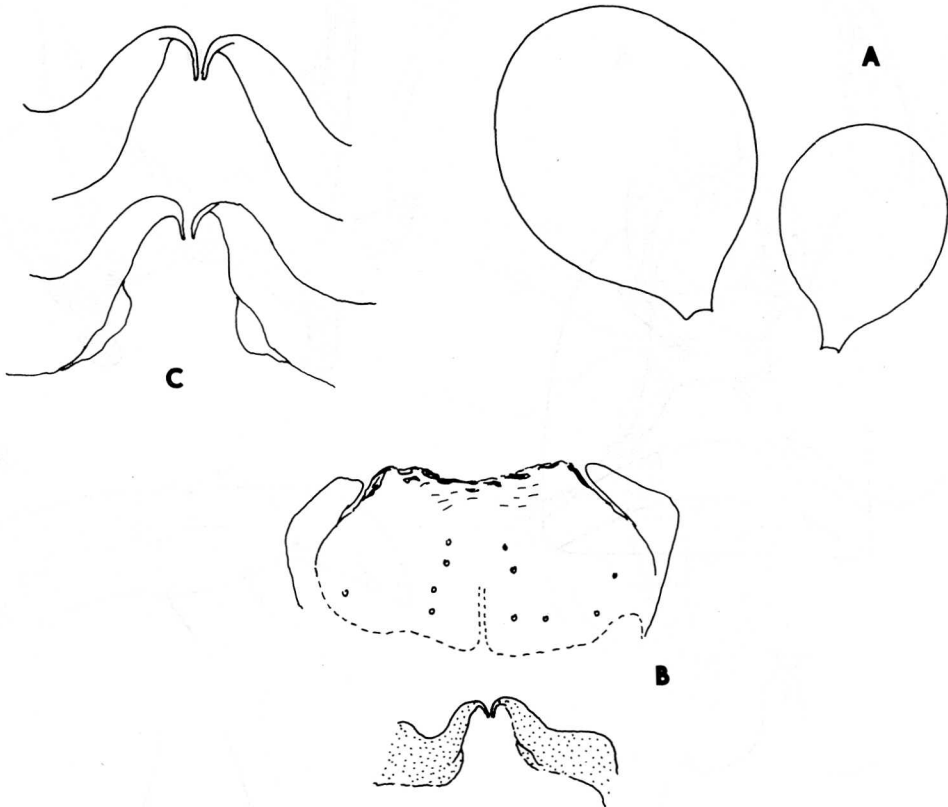


Fig. 8. *Brachypogon (Isohelea) hudjakovi* REMM, female: A – seminal capsules; B – sternites VIII and IX; C – apical projections of sternite IX.

***Brachypogon (Isohelea) incompletus* (KIEFFER, 1925)**

Figs 9-11

*Trishelea incompleta* KIEFFER, 1925a: 153 (♂, ♀, Zehlau Moor nr. Königsberg=Kaliningrad; Estonia); KIEFFER 1929: 290 (♂, ♀, Zehlau Moor).

*Ceratopogon (Isohelea) incompletus*: REMM 1974: 49 (♂, ♀, Estonia, Lituania, Russia, syn. *Ceratopogon perpusilla*, *C. lapiae*).

*Helea thienemanni* MAYER, 1940: 162 (♂, ♀, larva, pupa, Abisko, Sweden). NEW SYNONYMY.

*Ceratopogon (Isohelea) lapiae* CLASTRIER, 1961: 416 (♂, Finland).

*Ceratopogon (Isohelea) perpusillus* s. REMM (1974): REMM 1988: 45 (= *incompletus*, *lapiae*, distribution).

*Brachypogon (Isohelea) perpusillus* s. REMM: WIRTH & GROGAN 1988: 32 (combination; syn. of *incompletus* KIEFFER); SZADZIEWSKI 1991: 104 (record from Poland).

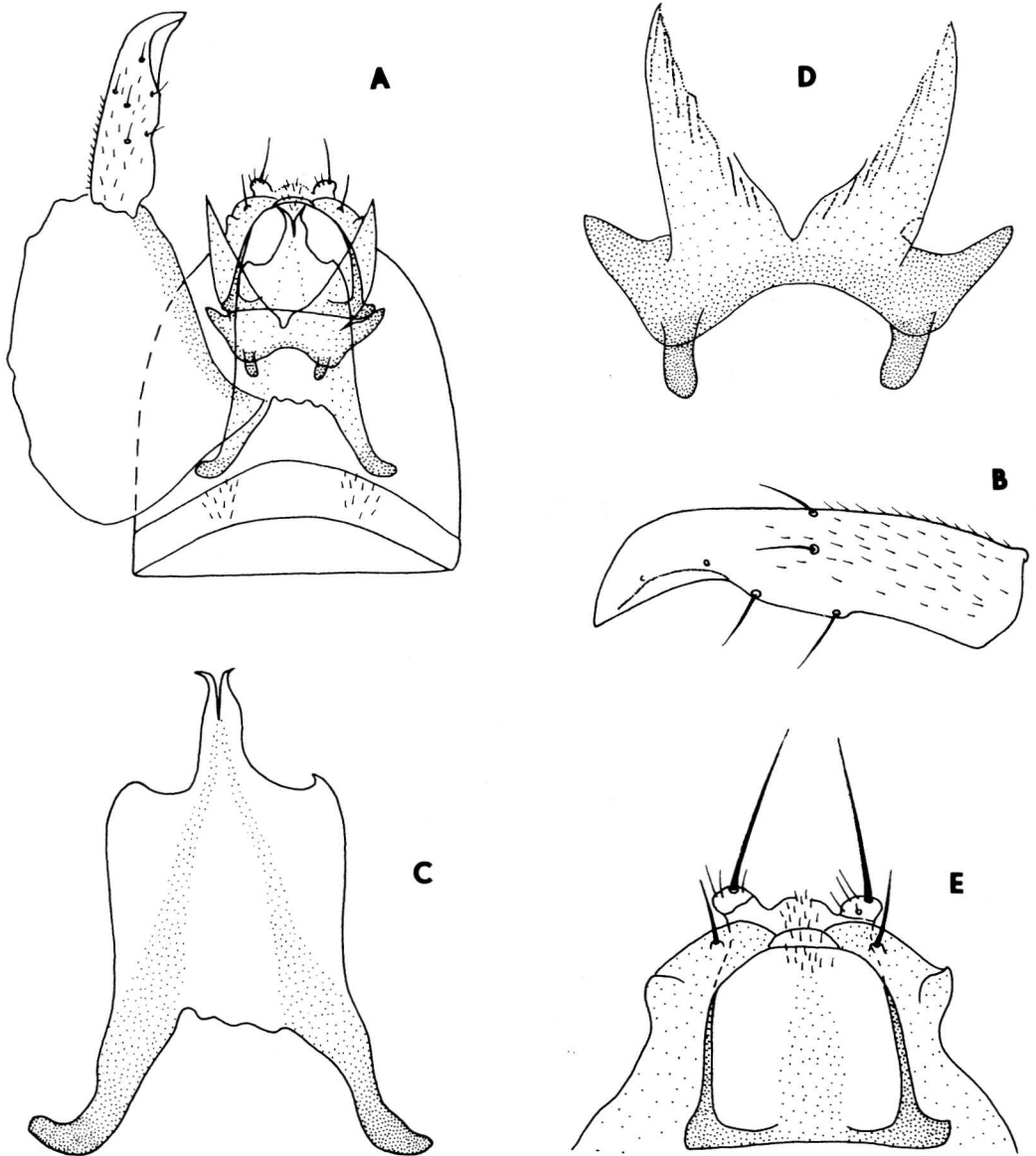


Fig. 9. *Brachypogon (Isohelea) incompletus* (KIEFFER), male: A – ventral aspect of genitalia; B – gonostylus; C – aedeagus; D – parameres; E – proctiger and apex of tergite IX.



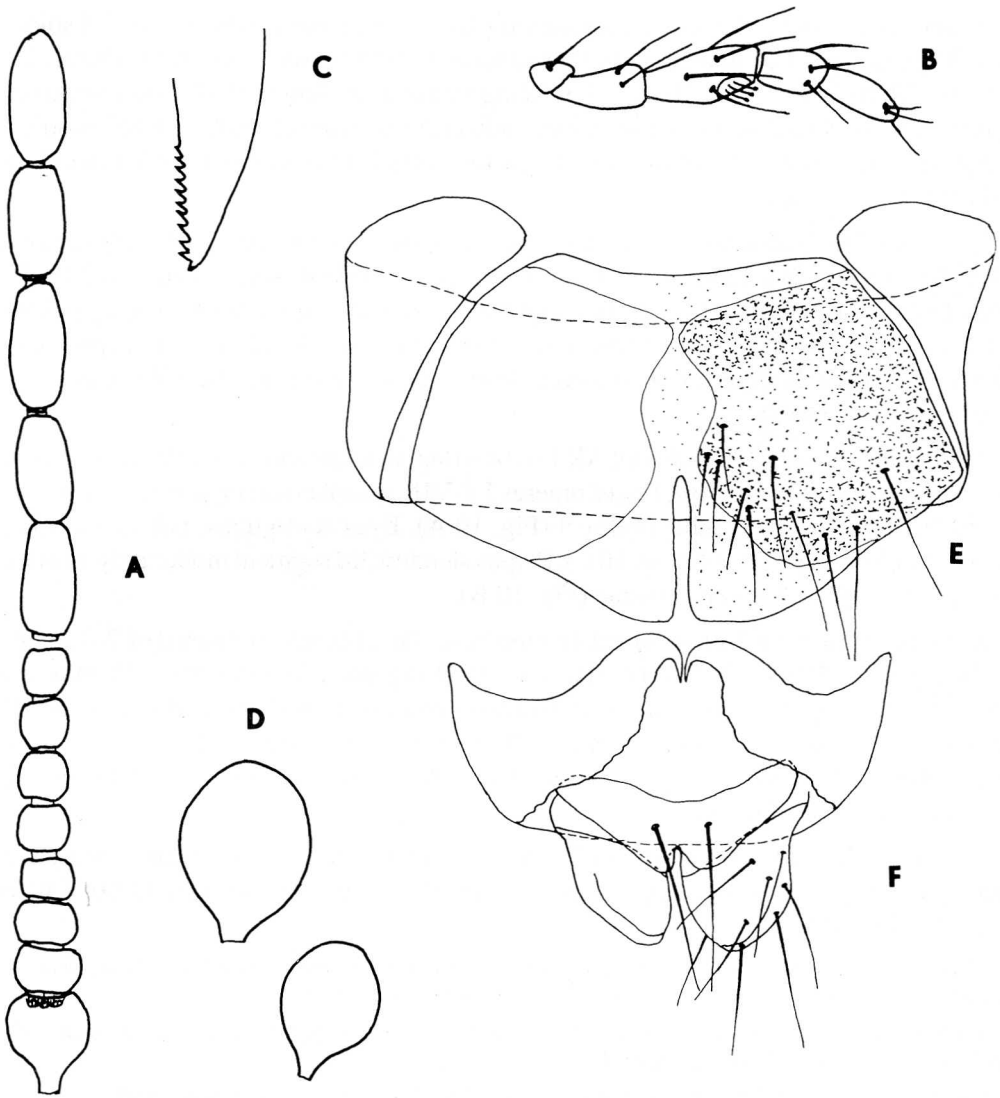


Fig. 10. *Brachypogon (Isohelea) incompletus* (KIEFFER), female: A – flagellum; B – palpus; C – mandible; D – seminal capsules; E – sternite VIII; F – sternites IX and X.

**Diagnosis.** Katepisternum with 2-4 setae. Male gonostyli with stout, abruptly pointed and curved tip; parameres massive, short and broadly fused, with broad blunt apices; and aedeagus with long narrow apex. Female with two unequal, asymmetrical seminal capsules.

**Description.** ♂. Flagellum length 484-618  $\mu\text{m}$ ; first flagellomere with 2-3 sensilla coeloconica. Third palpal segment with distinct sensory pit, length 37-52  $\mu\text{m}$ ; 4th segment bears 1-2 long setae; 5th segment as long as 3rd.

Katepisternum with 2-4 setae; anepisternum bare. Tibial comb composed of 7-8 spines. Hind basitarsus with a single row of palisade setae. Fourth tarsomeres subcylindrical. T(I) 1.3-1.6, TR(II) 1.8-2.1, TR(III) 1.6-1.8. Wing transparent, length 0.97-1.08 mm, costal ratio 0.51-0.54. Radial veins barely visible, radial cells well developed. Vein M2 obsolete. Wing membrane without microtrichia, a few macrotrichia present along wing margin in cell r4+5. Halter pale.

Genitalia (Fig. 9). Sternite IX short and broad; tergite IX long and broad, with a heavily sclerotized rectangular frame on its ventral surface, cerci short, with 1 long and 2 shorter setae. Gonocoxite stout, almost as long as broad; gonostylus stout, with abruptly pointed and curved tip. Aedeagus broad and long, basal arms long, basal arch low; apex long, narrow, tip probably bipartite. Parameres short, broadly fused, and heavily sclerotized; distal portions v-shaped.

♀. Flagellum length 386-408 µm; AR 1.4; first flagellomere with 3 sensilla coeloconica, flagellomeres II-III transverse, flagellomeres IV-VIII subspherical or spherical, flagellomeres IX-XIII elongated subcylindrical (Fig. 10 A). Eyes contiguous, pubescent. Mandible with 11-13 medial teeth (Fig. 10 C). Palpus slender; 3rd segment moderately swollen; 4th segment with 1-2 (rarely 3) setae (Fig. 10 B).

Katepisternum with 2 setae; anepisternum bare. Tibial comb composed of 7-8 spines. TR(I) 1.5-1.6, TR(II) 1.8-2.0, TR(III) 1.8-1.9. Wing pale, length 0.93-1.10 mm, CR 0.61-0.63. Two symmetrical, unequal seminal capsules with short necks (Fig. 10 D), lengths 64-66 and 48-50 µm. Sternite VIII with deep narrow caudal notch; sternite unsclerotized along midline (Fig. 10 E). Anterior margin of each arm of sternite IX broadly excavated in the middle (Fig. 10 F).

Pupa. Thoracic horn (Fig. 11 A) heavily sclerotized, broad, with 7 spiracular openings. Operculum bears 2 anteromarginal setae on small tubercle (Fig. 11 D). Caudal processes short (Fig. 11 B, C).

Material examined. **Neotype** male of *Trishelea incomleta* KIEFFER, Poland, Masurian Lakeland, Silec nr. Kętrzyn, deciduous forest, 5 vii 1981, R. SZADZIEWSKI [UG].

**Syntypes** of *Helea thienemanni* 4 ♂♂, 2 ♀♀, pupae, labelled "Lappland, 121, *Helea thienemanni* n. spec.", in collection of Dr P. HAVELKA, Karlsruhe.

Eastern Baltic Coasts: Barciany near Kętrzyn, 12 vii 1981, 1 ♂, near pond, R. SZADZIEWSKI.

Southern Baltic Lakelands: Babimost nr. Zielona Góra, forest section 103, 23 vii 1987, 1 ♂, IZPAN.

Eastern Baltic Lakelands: Silec nr. Kętrzyn, 5 vii 1981, in deciduous forest, 1 ♀, R. SZADZIEWSKI; Żytkiejmy, 3 vi 1981, 1 ♂, R. SZADZIEWSKI; Kunicha and Czarny Las near Sztabin, 7 vi to 16 ix 1985, flowers of *Cicuta virosa* L., *Sium latifolium* L., *Angelica silvestris* L., *Pimpinella saxifraga* L., *Aegopodium podagraria* L., *Carum carvi* L., 17 ♂♂, 12 ♀♀, J. KRZYWIŃSKI; Rubcowo in Puszcza Augustowska, 22 vii 1977, 2 ♀♀, at light, R. SZADZIEWSKI.

Podlasie: Puszcza Białowieska: forest section 538 Ba, 3 vi 1987, yellow pan trap in a pine forest, 1 ♂, 2 ♀♀; forest section 634 Ef, 31 vi 1987, 1 ♀, IZPAN. Białowieża, 4 vi 1981, 1 ♂, at light, 1 ♀, R. SZADZIEWSKI.

**Biology and distribution.** Adults are common on umbelliferous flowers in May and July. This species is distributed in Europe (France, Sweden, Finland, Estonia, Lithuania, Ukraine, Poland, Russia - Petersburg obl., Kaliningradskaja obl., Czelabinskaja obl.), western and eastern Siberia and the Far East of Russia. A record from Germany (HAVELKA 1976) is questionable. The figures of the male and female of *Ceratopogon*

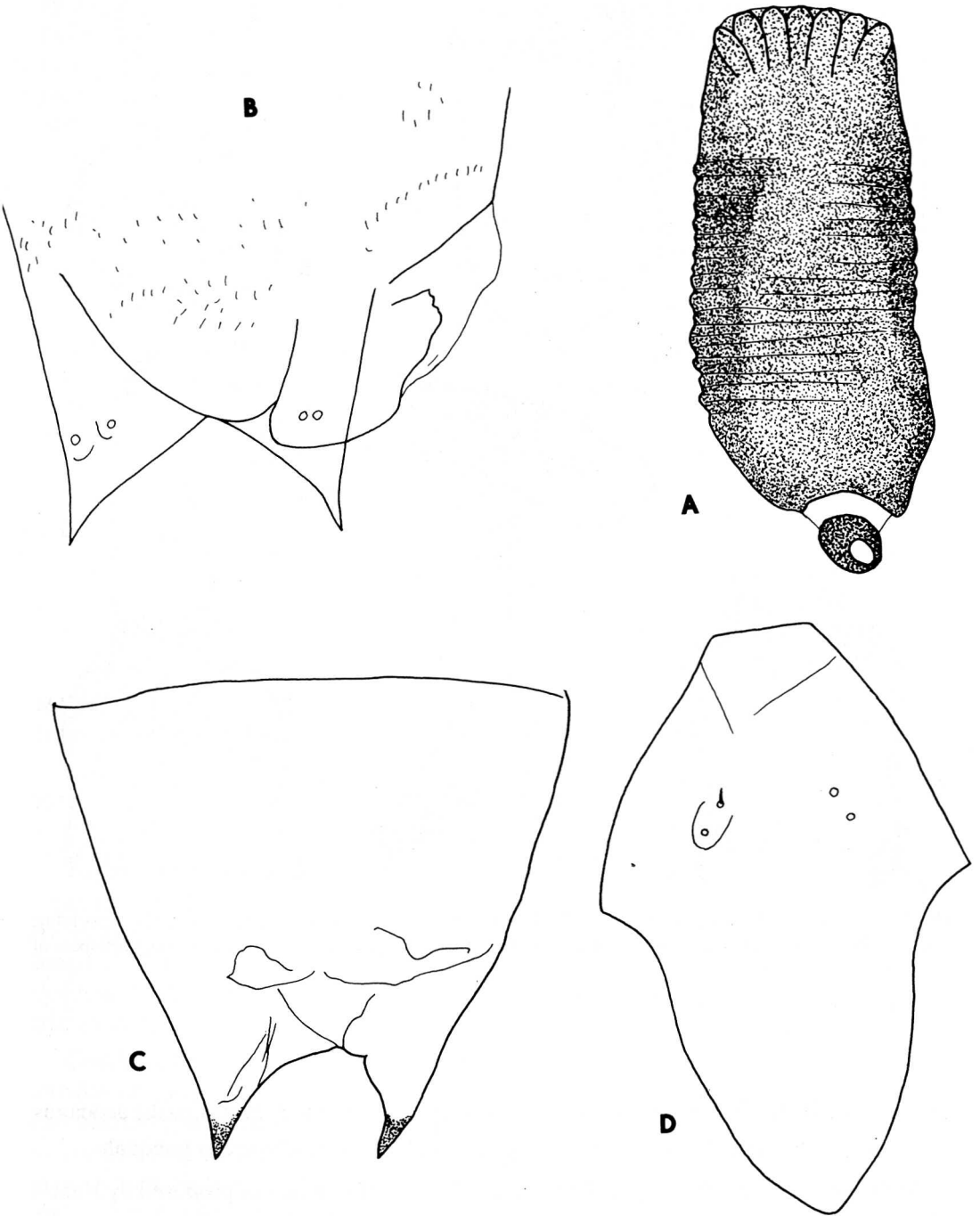


Fig. 11. *Brachypogon (Isohelea) incompletus* (KIEFFER), pupa: A – thoracal horn; B, C – shape of anal end; D – operculum.

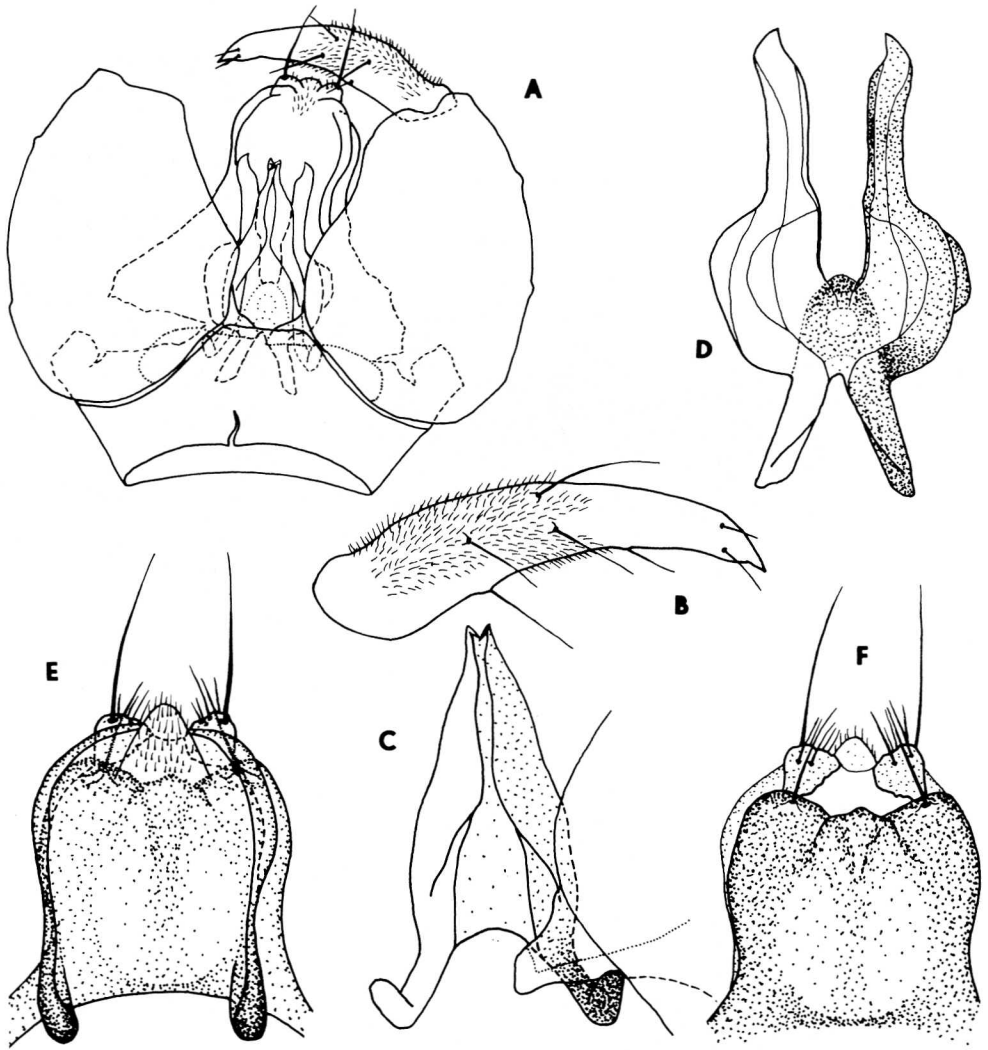


Fig. 12. *Brachypogon (Isohelea) perpusillus* (EDWARDS), male: A – ventral aspect of genitalia; B – gonostylus; C – aedeagus; D – parameres; E – ventral aspect of proctiger and apex of tergite IX; F – dorsal aspect of tergite IX and proctiger.

*perpusilla* s. REMM in HAVELKA (l. c.) probably represent another species, as the aedeagus is slender, without lateral shoulders, and the seminal capsules are greatly unequal.

**D i s c u s s i o n .** We follow the interpretation of this species as proposed by REMM (1974). As a rule, KIEFFER did not preserve his described specimens, so in order to stabilize the nomenclature of that species we designate a neotype collected from an area lying about 100 km from the original terra typica.

REMM (1974) proposed to treat *C. (I.) perpusilla* EDWARDS and *B. incompletus* as synonyms. The synonymy stated by REMM is not confirmed by the present study of the holotype of *Psilohelea perpusilla* collected in Scotland ( $\sigma$ , Brodick, Arran, 22-25 v 1919, F. W. EDWARDS). In contrast to all Polish species of the subgenus, the male of *B. (I.) perpusillus* has dark radial cells, and characteristic genitalia with short, broad parameres and a long triangular aedeagus (Fig. 12), which most closely resemble those of *B. bialoviesicus*.

***Brachypogon (Isohelea) nitidulus* (EDWARDS, 1921)**

Figs 13-14

*Psilohelea nitidula* EDWARDS, 1921: 125 ( $\sigma$ , Scotland).

*Ceratopogon (Isohelea) nitidulus* EDWARDS, 1926: 409 (Great Britain).

*Ceratopogon (Isohelea) nitidulus*: REMM 1988:45 (= *crassiforceps*, *turfacea*, *finniae*, distribution).

*Brachypogon (Isohelea) nitidulus*: WIRTH & GROGAN, 1988: 32 (combination); SZADZIEWSKI, 1991: 104 (record from Poland).

*Brachypogon nitidula*: DELECOLLE & RIEB 1990: 184 (record from France).

*Anakempia turfacea* KIEFFER, 1925 b: 415 ( $\sigma$ , Zehlau Moor, nr. Königsberg= Kaliningrad); KIEFFER 1929: 294 (as above in German).

*Ceratopogon (Isohelea) turfaceus*: REMM 1974: 52 ( $\sigma$ ,  $\varphi$ , Estonia, Lithuania, Russia, (= *Ceratopogon nitidulus*, *Ceratopogon finniae*).

*Trishelea crassiforceps* KIEFFER, 1925 b: 411 ( $\sigma$ ,  $\varphi$ , Zehlau Moor nr. Königsberg=Kaliningrad).

*Ceratopogon (Isohelea) finniae* CLASTRIER, 1961: 417 (( $\sigma$ , Finland).

**D i a g n o s i s .** Male gonostyli stout, with abruptly pointed and curved tip, parameres well developed, composed of two arms as long as tergite IX, and aedeagus with two appendices on the tip. Female with one seminal capsule.

**D e s c r i p t i o n .**  $\sigma$ . Flagellum length 546-680  $\mu$ m; plume well developed; first flagellomere with 2 sensilla coeloconica. Proboscis short. Third palpal segment swollen, with distinct sensory pit, length 46-63  $\mu$ m; 4th segment bears 1-2 long setae.

Katepisternum with 1 seta; anepisternum bare. Tibial comb composed of 8 spines. Hind basitarsus swollen, with a single row of palisade setae. Fourth tarsomere subcylindrical. Tarsal ratio of fore leg 1.3-1.6, of middle leg 1.7-2.0, of hind leg 1.7-1.9. Wing transparent, length 0.97-1.14 mm, costal ratio 0.51-0.54. Radial veins barely visible, radial cells well developed. Vein M2 obsolete. Wing membrane without microtrichia, with a few macrotrichia along wing margin in cell r4+5. Halter pale.

Genitalia (Figs 22-24). Sternite IX long and narrow, with distinct caudomedian excavation; tergite IX long, with distinct subapical constriction and long broad, blunt apicolateral process bearing a single seta; cerci large, with 2 large setae. Proctiger heavily sclerotized (Fig. 13 D). Gonocoxite stout, nearly as long as broad; gonostylus stout, slightly curved, apex slightly pointed. Aedeagus broad, apex with well developed lateral shoulders and 2 short submedian projections (Fig. 13 B). Parameres separate, heavily sclerotized (Fig. 13C), L-shaped.

$\varphi$ . Flagellum length 376-420  $\mu$ m, AR 1.08-1.22. First flagellomere with 3 sensilla coeloconica; flagellomeres II-III transverse to subspherical, IV-VIII subspherical or

spherical, IX-XIII elongated (Fig. 14 A). Mandible with 11-13 sharp medial teeth, oblique to the mandibular axis except for apical two (Fig. 14 C). Third palpal segment 42-44  $\mu\text{m}$  long, moderately swollen (Fig. 14 B); 4th segment bears 1-2 setae.

Katepisternum with 1 seta; anepisternum bare. Tibial comb with 8 spines. TR(I) 1.5-1.6, TR(II) 1.9-2.0, TR(III) 2.0. Wing length 1.04-1.26 mm, CR 0.58-0.59. Radial cells pale. Halter knob pale.

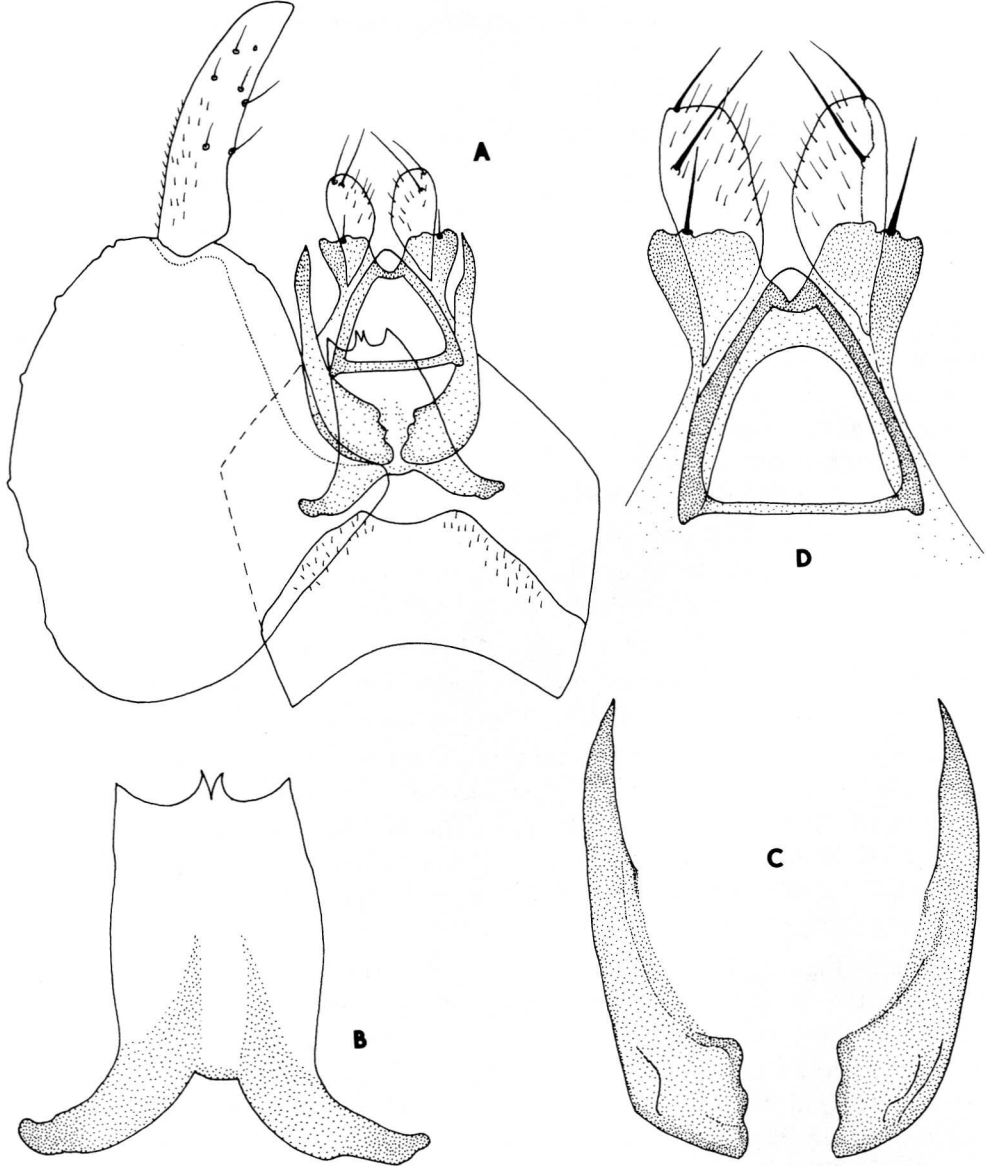


Fig. 13. *Brachypogon (Isohelea) nitidulus* (EDWARDS), male: A – ventral aspect of genitalia; B – aedeagus; C – parameres; D – proctiger and apex of tergite IX.

One seminal capsule with short neck (Fig. 14 D). Sternite VIII nearly uniformly sclerotized with a triangular caudal excavation (Fig. 14 E). Arms of sternite IX with long sharp recurved tips (Fig. 14 F).

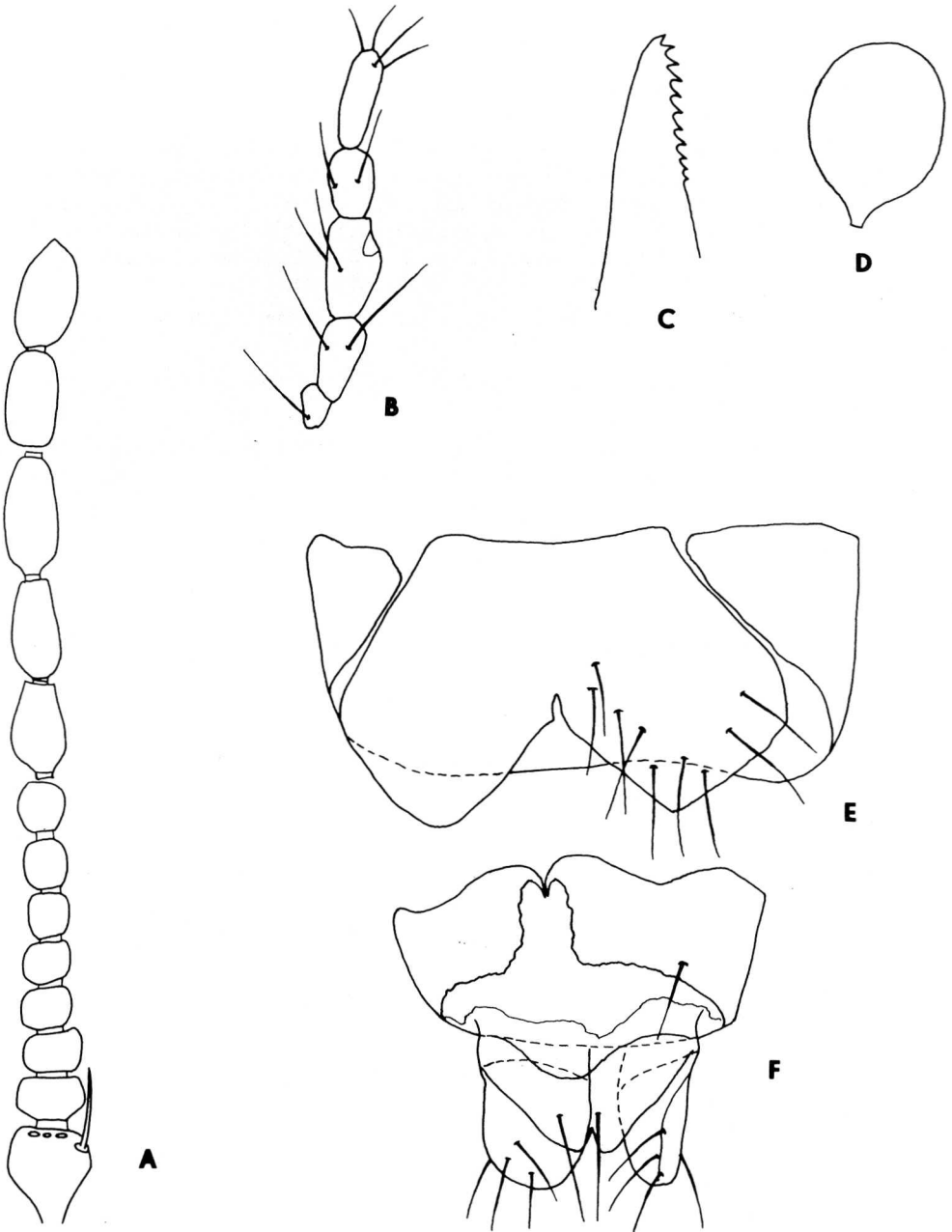


Fig. 14. *Brachypogon (Isohelea) nitidulus* (EDWARDS), female: A – flagellum; B – palpus; C – mandible; D – seminal capsule; E – sternite VIII; F – sternites IX, X and cerci.

**Material examined.** Southern Baltic Coasts: Brzyno nr. Żarnowieckie Lake, 2 vi 1982, 1 ♀, R. SZADZIEWSKI.

Eastern Baltic Coasts: Wyskok nr. Kętrzyn, 29 v 1993, 1 ♂, J. KRZYWIŃSKI.

Southern Baltic Lakelands: Miastko, netting, 27 vii 1990, 1 ♂, A. WARZOCHA.

Eastern Baltic Lakelands: Kutry nr. Węgorzewo, forest section 13, 29 vi 1985, yellow pan trap, 1 ♂, IZPAN; as above, forest section 212, 1 vi 1985, yellow pan trap, 1 ♀, IZPAN; Olsztyn, 21 viii 1990, on umbelliferous flowers, 1 ♂, K. ZADROGA.

Central Polish Lowlands: Kampinoski National Park, 22-26 v 1980, yellow pan trap in an oak forest, 1 ♀, IZPAN.

Podlasie: Puszcza Białowiecka: forest section 637 Ef, 22 v 1987, yellow pan trap in a pine forest, 1 ♀; forest section 668 Ad2, 4 vi 1987, yellow pan trap in a pine forest, 1 ♂ 2 ♀♀; forest section 668 Cc, 4 vi 1987, yellow pan trap in a pine forest, 2 ♂♂ 1 ♀; forest section 634 Ef, 2 vii 1987, yellow pan trap in a pine forest, 1 ♂; forest section 315 D, 6 vi 1987, yellow pan trap in an ash forest, 1 ♂; forest section 668 Af1, 5 vi 1987, yellow pan trap in a pine forest, 1 ♀; forest section 538 Ba, 3 vi 1987, yellow pan trap in a pine forest, 3 ♀♀, IZPAN. Białowieża, 4 vi 1981, park, at light, 2 ♂♂ 1 ♀, R. SZADZIEWSKI;

Eastern Małopolska Upland: Roztoczański National Park, forest section 188/287, 1-17 vii 1987, yellow pan trap in a pine forest, 1 ♂, IZPAN.

Belgium: Baraque Fraiture: 1 vi 1955, Bouleaux, 1 ♂; 16 vi 1955, Meum, 1 ♀; from collection of Institut Royal des Sciences Naturelles de Belgique, Bruxelles.

**Biology and distribution.** This species inhabits moist habitats and both sexes visit flowers. It is widely distributed in Europe (Belgium, France, Great Britain, Finland, Estonia, Lituania, Poland, Russia—Petersburskaja obl., Karelia, Kaliningradskaja obl.), West and East Siberia and Sakhalin. In Poland it is the most common species of the subgenus *Isohelea*.

### *Brachypogon (Isohelea) silecis* SZADZIEWSKI, 1990

Fig. 15

*Brachypogon (Isohelea) silecis* SZADZIEWSKI, 1990: 485 (♂, Poland).

**Diagnosis.** Male gonostyli short, stout, with sharply pointed and curved tip; distal projections of parameres not developed; and aedeagus with broad concave apex. Female unknown.

**Description.** ♂. Flagellum length 532-556 µm; first flagellomere with 4 sensilla coeloconica. Third palpal segment moderately swollen, with distinct sensory pit, length 41-42 µm; 4th segment bears 2 long setae.

Katepisternum with 2 setae; anepisternum bare. Tibial comb composed of 7 spines. Hind basitarsus slightly swollen, with a single row of palisade setae. Fourth tarsomeres subcylindrical (Fig. 15 A). TR(I) 1.3-1.4, TR(II) 1.9, TR(III) 1.6-1.9. Wing transparent, length 0.94-0.97 mm, costal ratio 0.50-0.52. Radial veins barely visible, only 2nd radial cell well developed, 1st linear. Vein M2 obsolete. Wing membrane without microtrichia, a few macrotrichia along wing margin in cell r4+5. Halter pale.

**Genitalia** (Fig. 15 C-G). Sternite IX short and broad, with deep V-shaped caudomedian excavation (Fig. 15 C); tergite IX with indistinct apicolateral lobes bearing single apical seta. Proctiger in shape of a heavily sclerotized rectangular frame (Fig. 15 G). Cerci moderately long, each with long seta. Gonocoxite stout, nearly as broad as long; gonostylus



short, stout, with abruptly pointed and curved tip (Fig. 15 D). Aedeagus broad and relatively short, basal arms long, basal arch low; tip broad, slightly concave (Fig. 15 E). Parameres fused, small, composed of a flat bridge-like structure that connects the short basal apodemes (Fig. 15 F). Parameres fused, small, composed of a flat bridge-like structure that connects the short basal apodemes (Fig. 15 F).

♀. Unknown.

**Material examined.** **H o l o t y p e** ♂, Silec nr. Kętrzyn, 23 vii 1981, on umbelliferous flowers, R. SZADZIEWSKI. Brzyno at Żarnowieckie Lake, 2 vi 1982, 1 ♂, R. SZADZIEWSKI.

**N o t e .** The species is known only from two localities in northern Poland.

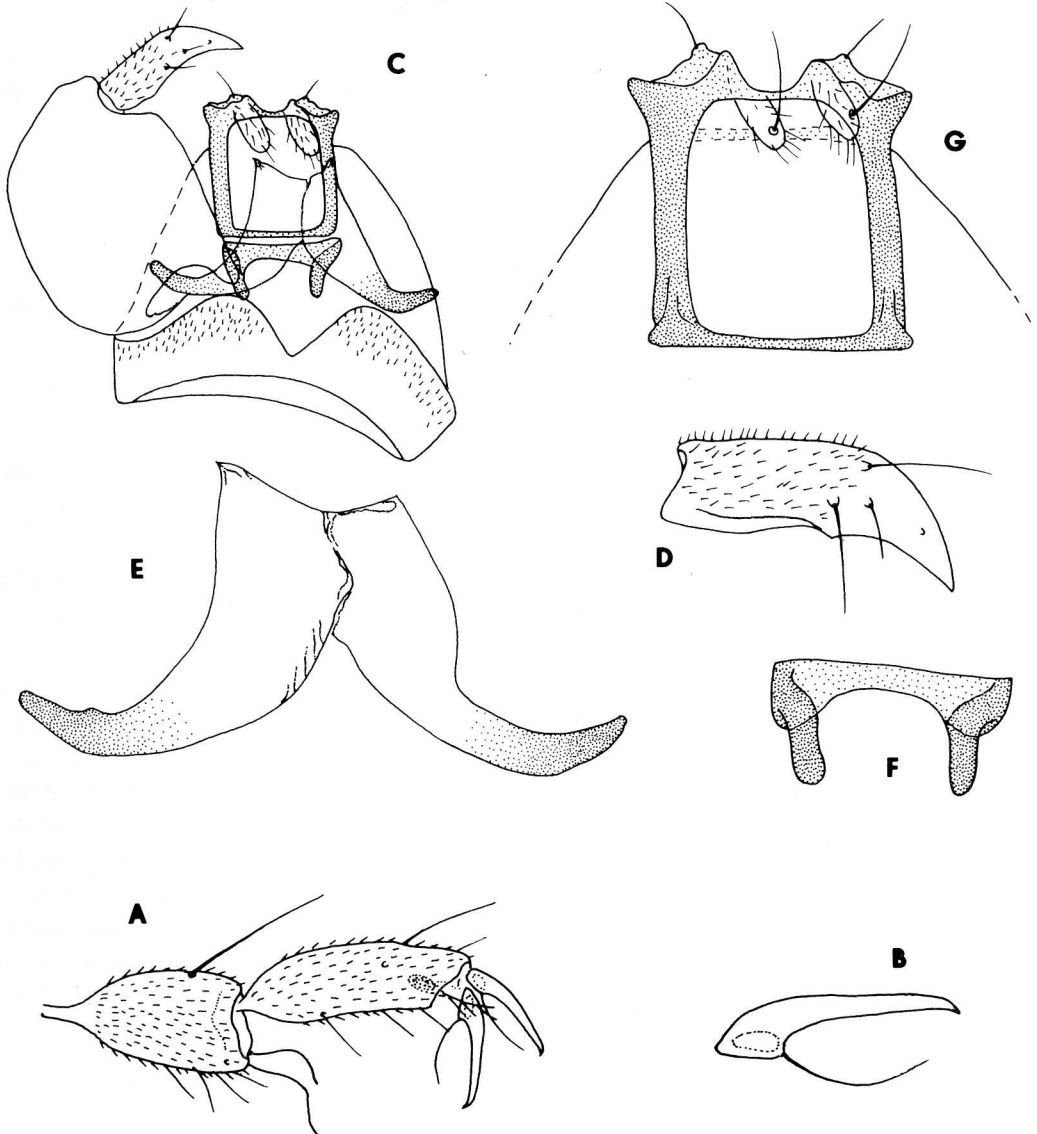


Fig. 15. *Brachypogon (Isohelea) silecis* SZADZIEWSKI, male: A – fourth and fifth tarsomeres; B – lateral aspect of claw; C – ventral aspect of genitalia; D – gonostylus; E – aedeagus; F – parameres; G – proctiger and apex of tergite IX.

*Brachypogon (Isohelea) sociabilis* (GOETGHEBUER, 1920)

Figs 16-17

*Psilohelea sociabilis* GOETGHEBUER, 1920: 68 (♂, ♀, Hockai, Belgium).*Ceratopogon (Isohelea) sociabilis*: EDWARDS 1926: 408 (Great Britain); REMM, 1974: 48 (♂, ♀, redescription, distribution: Estonia, Latvia, northern European part of Russia).*Brachypogon (Isohelea) sociabilis*: WIRTH & GROGAN 1988: 32 (combination); SZADZIEWSKI 1991: 104 (record from Poland).

**D i a g n o s i s**. Male aedeagus long, slender, with blunt somewhat expanded apex. Female with two unequal, slightly asymmetrical seminal capsules with long neck.

**D e s c r i p t i o n**. ♂. Flagellum length 514-567 µm, plume well developed; first flagellomere with 3 sensilla coeloconica. Third palpal segment moderately swollen, with distinct sensory pit, length 40-50 µm; 4th segment bears 2 long setae.

Katepisternum with 2 long setae; anepisternum bare. Tibial comb composed of 7 spines. Hind basitarsus swollen, with a single row of palisade setae. Fourth tarsomeres subcylindrical. TR(I) 1.4-1.6, TR(II) 1.9-2.1, TR(III) 1.6-1.8. Wing transparent, length 1.00-1.09 mm, costal ratio 0.52-0.54. Radial veins barely visible, radial cells well developed. Vein M2 obsolete. Wing membrane without microtrichia, a few macrotrichia along wing margin in cell r4+5. Halter pale.

Genitalia (Fig. 16). Sternite IX short and broad (Fig. 16 A); tergite IX with weakly developed apicolateral lobes, each with single apical seta. Proctiger well sclerotized (Fig. 16 D). Cerci indistinct. Gonocoxite long, stout; gonostylus long and slender, with slightly pointed and curved tip. Aedeagus very long, slender, apex blunt and somewhat expanded, basal arms short (Fig. 16 B). Parameres well developed, fused on basal half, apices pointed and greatly diverging (Fig. 16 C).

♀. Flagellum length 354-371 µm, AR 1.25-1.41. First flagellomere with 3 sensilla coeloconica. Mandible with 13 medial teeth. Third palpal segment moderately slender, length 37-42 µm; 4th segment bears 2 long seta.

Katepisternum with 2 long setae; anepisternum bare. Hind tibial comb composed of 8 spines; spur short, bifid. Fourth tarsomeres nearly cordiform (fig. 17 A). Hind basitarsus with a single row of straight palisade setae. TR(I) 1.4-1.5, TR(II) 2.0-2.1, TR (III) 1.8-2.1. Wing transparent, including radial cells, length 0.99-1.04 mm, CR 0.58-0.59. Wing membrane with a few macrotrichia along wing margin, microtrichia absent. Halter knob pale.

Two unequal, slightly asymmetrical seminal capsules present, with long necks (Fig. 17 B); larger 71-77 µm long, smaller 60-66 µm long. Sternite VIII separated from tergite VIII, heavily sclerotized except for caudal lobes. Sternite IX broadly sclerotized, with broad, short, simple, straight submedian projection. Sternite X with 2 long setae.

**M a t e r i a l e x a m i n e d**. Eastern Baltic Coasts: Masurian Lakeland, Barciany nr. Kętrzyn, 12 vii, sweeping at pond, 1 ♀. R. SZADZIEWSKI.

Podlasie: Puszcza Białowiecka: Białowieża, palace park, at light, 4 vi 1981, 1 ♀, R. SZADZIEWSKI; forest section 538 Ba, 22 v 1987, 2 ♂♂ 1♀; 538 Bc, 3 vi 1987, 1♂ 2 ♀♀; forest section 538 Bf, 3 vi 1987, 1 ♀; forest section 668 Ad2, 4 vi 1987, 1 ♀; forest section 668 Cc, 4 vi 1987, 1 ♀; all in yellow pan traps in a pine forest, IZPAN.

Central West Carpathians: Tatry Mts., Zakopane, 6 viii 1981, in peaty meadows at Olczyski stream, 850 m, 1 ♂, R. SZADZIEWSKI.

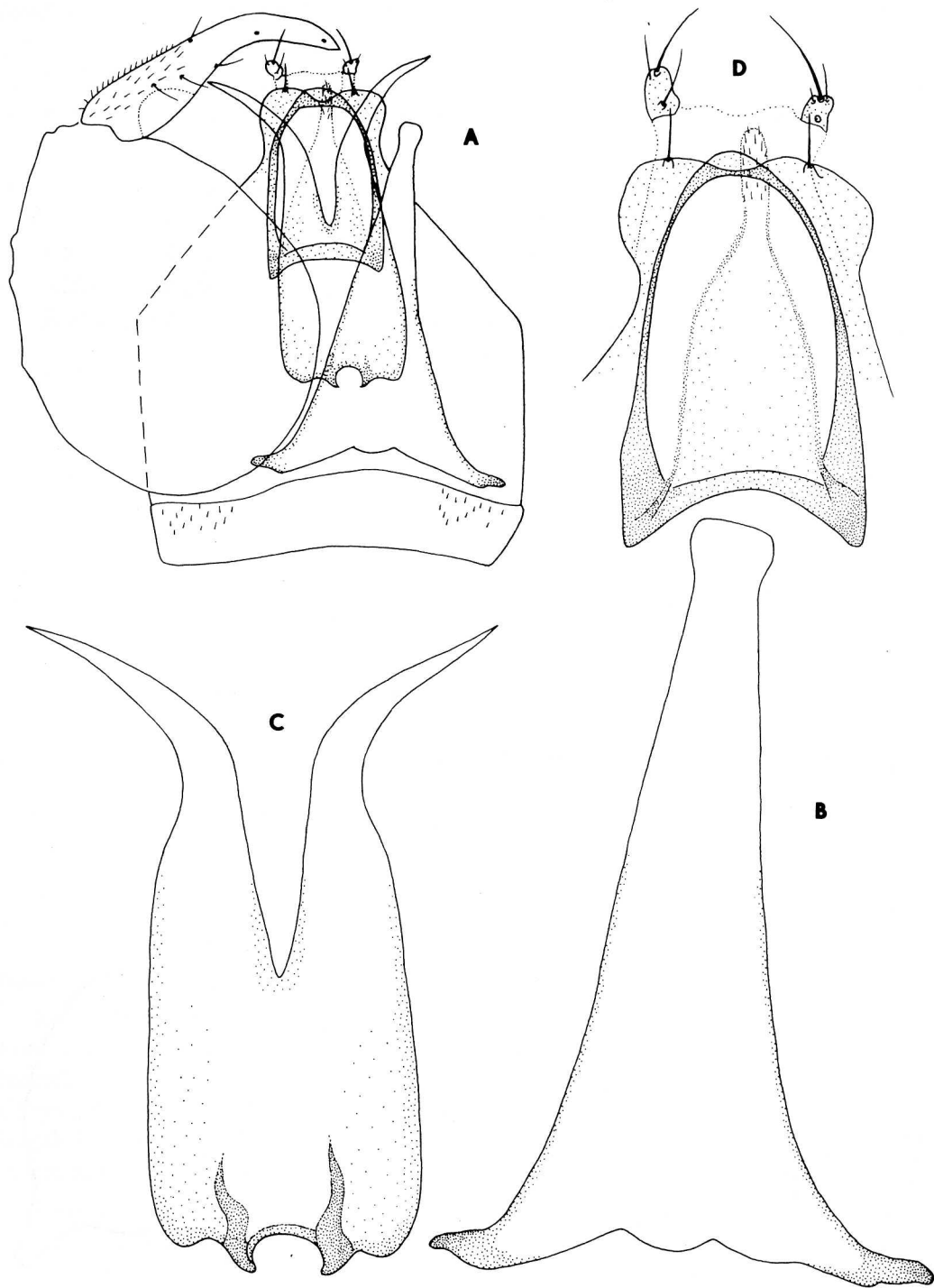


Fig. 16. *Brachypogon (Isohelea) sociabilis* (GOETGHEBUER), male: A – ventral aspect of genitalia; B – aedeagus; C – parameres; D – proctiger and apex of tergite IX.

**Biology and distribution.** This species inhabits a wide variety of moist habitats such as the margins of lakes and ponds, and adults visit flowers. It is widely distributed in middle and northern Europe (Belgium, Germany, Great Britain, Norway, Sweden, Finland, Poland, Estonia, Latvia, Russia). In Poland, adults fly from the 3rd week of May to the 1st week of August.

**Discussion.** KARL (1940) recorded this species from Pomerania. A re-examination of this material by SZADZIEWSKI (1985 p. 294) showed that all specimens determined by KARL as *Helea sociabilis* are actually *Culicoides obsoletus* (MEIGEN). The present assignment of a female to this species is not absolutely certain, but highly possible. We suggest that REMM (1974) misidentified females when he redescribed females of *B. sociabilis* as having seminal capsules with short necks.

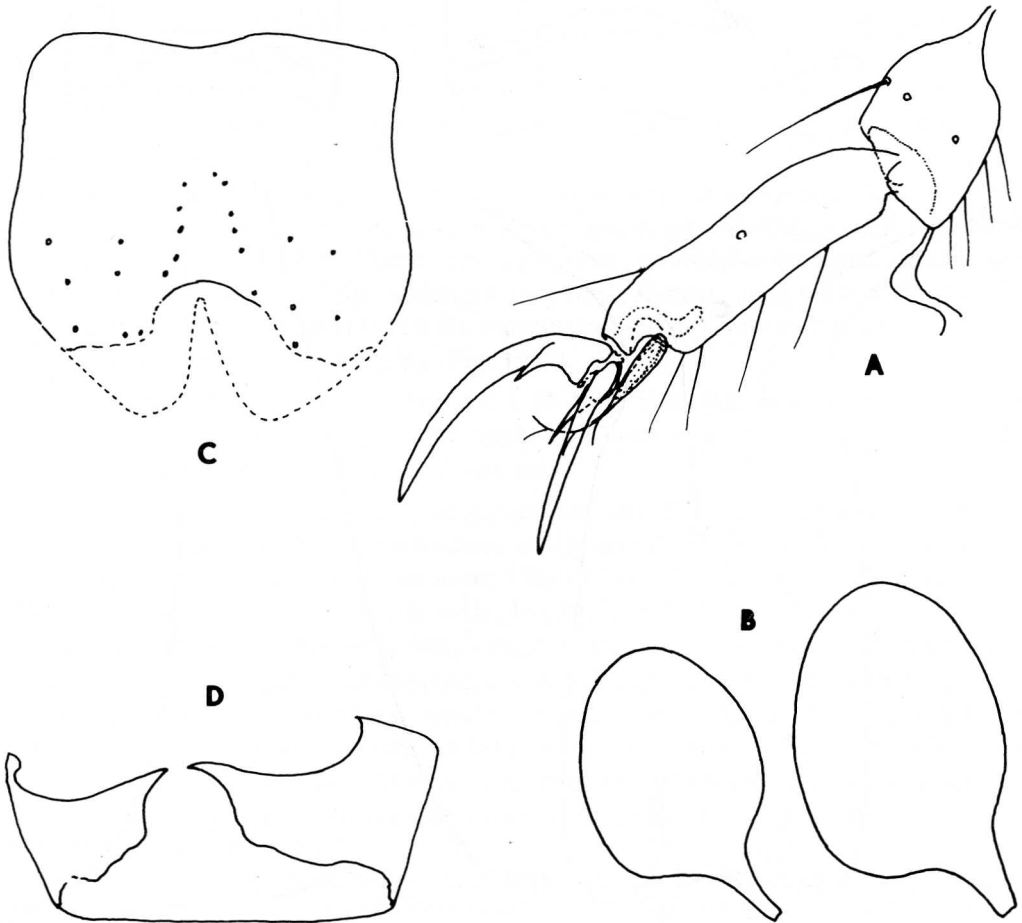


Fig. 17. *Brachypogon (Isohelea) sociabilis* (GOETGHEBUER), female: A – fourth and fifth tarsomeres; B – seminal capsules; C – sternite VIII; D – sternite IX.

***Brachypogon (Isohelea) zavoicus* SZADZIEWSKI sp. n.**

Figs 18-19

**D i a g n o s i s .** The only species in the genus with median anepisternal seta. Male gonostylus with bilobed apex.

**Description.** ♂. Total length of flagellum 556 µm. First flagellomere with 2 sensilla coeloconica. Third palpal segment broad, with distinct sensory pit, length 52 µm; 4th segment bears 2 long setae.

Katepisternum with 2-3 lateral setae; anepisternum with 1 medial seta (Fig. 18 A). Hind tibial comb composed of 7 spines; spur short, bifid or trifid. Fore tibial spur apparently absent. Hind basitarsus swollen, with a single row of straight palisade setae. Fourth tarsomeres subcylindrical. T(II) 1.8. Wing transparent, length 1.06 mm, costal ratio 0.51. Radial veins barely visible, radial cells well developed. Vein M2 obsolete. Wing membrane without microtrichia, a few macrotrichia along the posterior wing margin and in margin of cell r4+5. Halter yellowish.

Genitalia stout (Fig. 18 A-G). Sternite IX short and broad, with shallow caudomedian excavation (Fig. 18 A); tergite IX with distinct subapical constriction, apicolateral lobes rounded, heavily sclerotized, each with 1 long apical seta. Cerci greatly reduced, with 2 or 3 long apical setae. Hypoproct heavily sclerotized, forming U-shaped shield behind aedeagus (Fig. 18 B, G). Gonocoxite stout; gonostylus long, distal third flattened, curved and bilobed, ventral surface at midlength with long spine-like seta on distinct tubercle and 3 long setae anteriorly, outer and lateral surfaces of the base covered with short setae, distal half bare (Fig. 18 C, D). Aedeagus long, slender, triangular; basal arms long, nearly parallel to main body, basal arch high; tip with lateral sharp shoulders nearly as long as median triangular forked extension (Fig. 18 E). Parameres broad, H-shaped, fused on basal half; distal projections slender, diverging and tapering apically; basal apodeme short (Fig. 18 B, F).

♀. Similar to male with the usual sexual differences. Flagellum length 430 µm, AR 1.22. First flagellomere with 2 sensilla coeloconica. Third palpal segment with relatively deep sensory pit, length 47 µm; 4th segment with 2 setae. Mandible armed with 13 medial equal sized teeth (Fig. 19 A).

Katepisternum with 2 lateral setae; anepisternum with 1 long median seta (Fig. 19 B). Fore tibial spur long, slender, and smooth. Hind tibial spur dark, shorter than fore spur, forked; comb with 8 setae. Tarsal ratio of fore leg 1.43, of mid leg 1.87, of hind leg 1.93. Claws long and nearly equal in length, each with basal inner tooth. Wing transparent, length 1.16mm, CR 0.57. Wing membrane without microtrichia; macrotrichia in single sparse row along length of wing margin. Two barely visible radial cells present.

Two greatly unequal symmetrical seminal capsules (Fig. 19 C). Larger measuring 77 x 53 µm, smaller 24 x 15 µm. Sternite VIII separated from tergite VIII; heavily sclerotized on proximal half except for V-shaped median portion; caudal half weakly sclerotized, with shallow caudomedian V-shaped excavation. Sternite IX separated medially; lateral arms simple, with slender slightly recurved apices. Sternite X with 2 long setae directed caudally (Fig. 19 D).

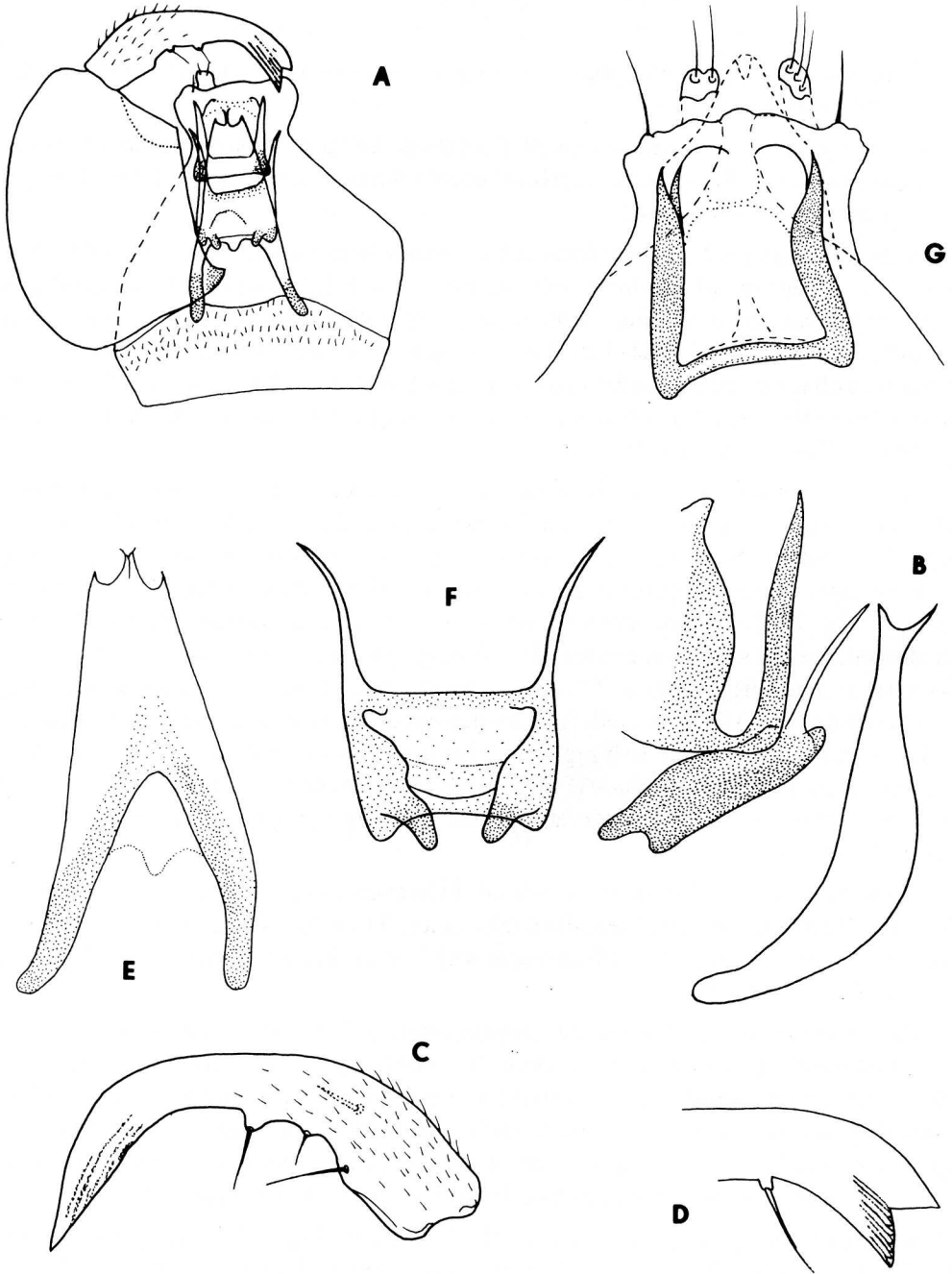


Fig. 18. *Brachypogon (Isohelea) zavoicus* sp. n., male: A – ventral aspect of genitalia; B – lateral aspect of aedeagus; parameres and proctiger; C – gonostylus; D – tip of other gonostylus; E – aedeagus; F – parameres; G – proctiger and apex of tergite IX.

Material examined. **Holotype** ♂, Carpathians, Babia Góra Mt., Zawoja-Barańcowa, 27 vi 1989, 700 m, on umbelliferous flowers, R. SZADZIEWSKI [UG]. **Paratype** ♀, Carpathians, Czarne nr. Wisła, by Biała Wisłka river, netting, 16 vii 1992, J. KRZYWIŃSKI [UG].

**E t y m o l o g y**. This species is named after the type-locality of the holotype, Zawoja-Barańcowa in the Babia Góra Mt. of the Carpathian range, Poland.

**D i s c u s s i o n**. This new species probably represents a mountain or boreal faunal element of northern Europe. It is apparently the only species in the genus to have anepisternal setae. Its male genitalia resemble those of *B. (I.) alpinus* (CLASTRIER, 1961) from the Alps of Austria and Switzerland. In that species however, the gonostylus is smooth without ventral expansions or tubercles and the tip is simple. In addition, the apex of the aedeagus lacks lateral shoulders, and the lateral distal arms of parameres are much stouter than in *B. zavoicus*. Females of *B. alpinus* and this new species are very similar, and both species have greatly unequal seminal capsules.

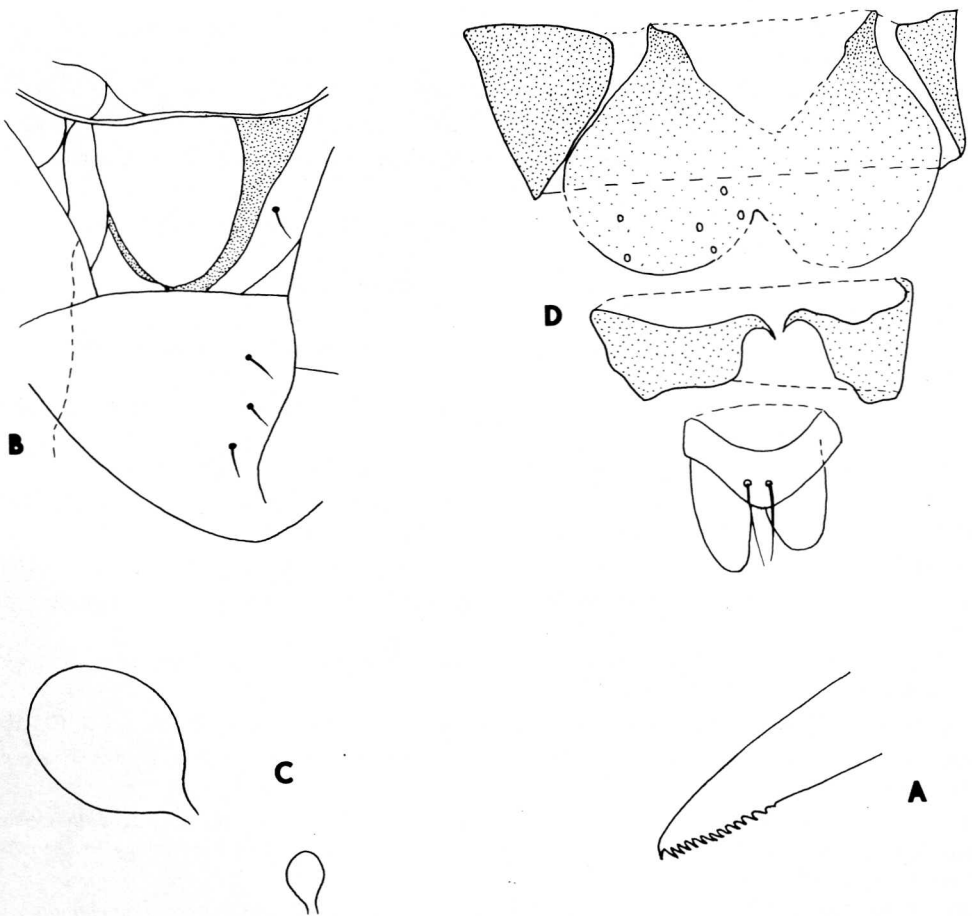


Fig. 19. *Brachypogon (Isohelea) zavoicus* sp. n., female: A – mandible; B – anepisternum and katepisternum; C – seminal capsules; D – genitalia.

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